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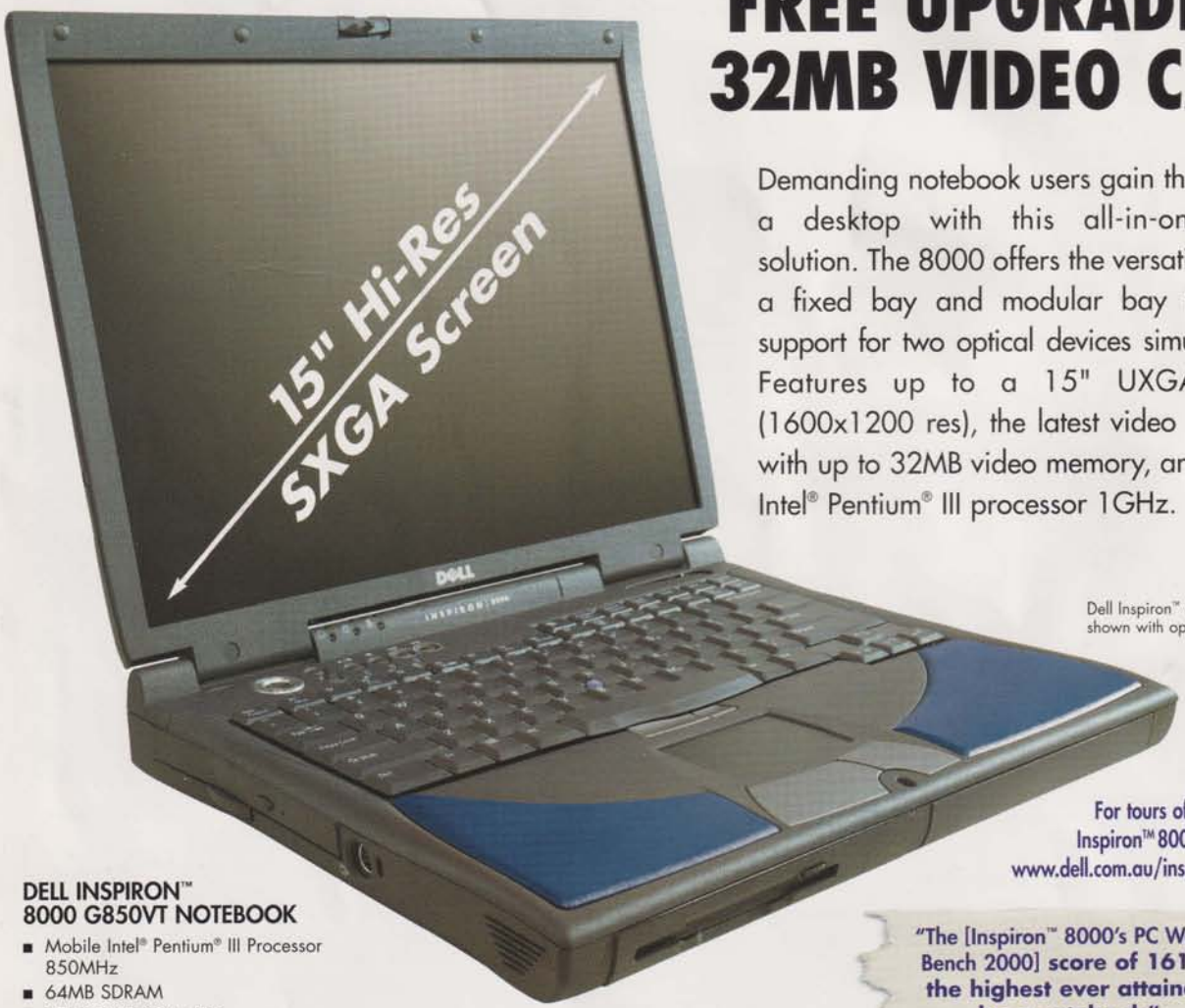
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Dell Dimension™ 4100 Desktop	Intel® Pentium® III Processor 1GHz	128MB 133MHz SDRAM	16MB ATI Rage 128 Pro 4 X AGP	15" Colour (13.8" v.i.s.)	20GB[1]	Creative Labs SoundBlaster 64Voice PCI		48X Max CD-ROM	Free Upgrade to: 17" Colour Monitor (15.9" v.i.s.)	B240516Z-470105	$15.95	$1,999*
Dell Dimension™ 4100 Desktop	Intel® Pentium® III Processor 866 MHz	64MB 133MHz SDRAM	16MB ATI Rage 128 Pro 4X AGP	15" Colour (13.8" v.i.s.)	20GB[1]	Creative Labs SoundBlaster 64Voice PCI		48X Max CD-ROM	Free Upgrade to: 17" Colour Monitor (15.9" v.i.s.)	B240514Z-470105	$15.00	$1,799*
Dell Dimension™ L Desktop	Intel® Pentium® III Processor 866 MHz	128MB SDRAM	Intel® 3D Direct AGP	15" Colour (13.8" v.i.s.)	20GB[1]	Creative Labs SoundBlaster 64Voice		48X Max CD-ROM	Free Upgrade to: 17" Colour Monitor (15.9" v.i.s.)	B240513-470105	$14.10	$1,699*
Dell Dimension™ L Desktop	Intel® Celeron™ Processor 700 MHz	64MB 100MHz	Intel® 3D Direct AGP	15" Colour (13.8" v.i.s.)	20GB[1]	Creative Labs SoundBlaster 64Voice		48X Max CD-ROM	Upgrade to: 17" Colour Monitor (15.9" v.i.s.)	B240511-470105	$12.30	$1,399*

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These Dimension™ Desktops come with a 3.5" Floppy drive, keyboard, mouse, Norton Anti-Virus 2000 OEM, 1 Year Limited Warranty (Second business day on-site service[4]), Microsoft® Work Suite OEM 2000 (8100) or Microsoft® Work Suite OEM 2001 (L & 4100).



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Dell Inspiron™ 8000 G1000VT Notebook	Mobile Intel® Pentium® III Processor 1GHz	128MB SDRAM	32MB DDR 4X AGP NVIDIA® GeForce2 Go™ 3D Video	15" Super XGA + TFT Display (1400x1050)	20GB[1]	8X Max DVD-ROM	Internal Mini-PCI 56K Fax	Case	Save $200[3]	B540539-470105	$39.95	$4,799*
Dell Inspiron™ 4000 G850GT Notebook	Mobile Intel® Pentium® III Processor 850MHz featuring Intel® Speedstep® technology	128MB SDRAM	8MB AGB 2X ATI MOBILITY 128™ 3D Video	14.1" XGA TFT (1024x768)	10GB[1]	24X Max CD-ROM	Internal Mini-PCI 56K Fax	Case	Free Upgrade to: 256MB SDRAM	B540529-470105	$30.75	$3,699*
Dell Inspiron™ 2500 G700ST Notebook	Mobile Intel® Pentium® III Processor 700MHz featuring Intel® Speedstep® technology	64MB SDRAM	Intel® Integrated 3D AGP	12.1" SVGA TFT (800x600)	5.GB[1]	24X Max CD-ROM		Case	Free Upgrade to: 128MB SDRAM	B540525-470105	$27.90	$3,199*
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Dell PowerEdge™ 2500SC Server	Intel® Pentium® III Processor 933MHz	128MB (2x64) SDRAM with EEC	Integrated Intel® Pro 100+ NIC	9GB[1] Ultra 160 SCSI	Integrated Dual Ultra3 (Ultra160) SCSI Adaptec AIC 7899	12/24X EIDE CD-ROM	Add: 9GB[1] LVD SCSI 10K HDD S541*	B420525-470105	$44.55	$5,369*
Dell PowerEdge™ 1400SC Server	Intel® Pentium® III Processor 866MHz	128MB SDRAM withEEC	Integrated Intel® Pro 100+ NIC	9GB[1] Ultra 160 SCSI	Integrated Dual Ultra 3/LVD SCSI Controller	20/48x EIDE CD-ROM	Add: 9GB[1] LVD SCSI 10K HDD S541*	B420512-470105	$21.70	$2,619*
Dell PowerEdge™ 300SC Server	Intel® Pentium® III Processor 800MHz	64MB 100MHz SDRAM with EEC	Intel® Pro 100+ NIC	10GB[1] IDE	Integrated IDE Controller	20/48x EIDE CD-ROM	Add: 10GB[1] EIDE 7.2K HDD S216*	B420510-470105	$16.65	$1,999*

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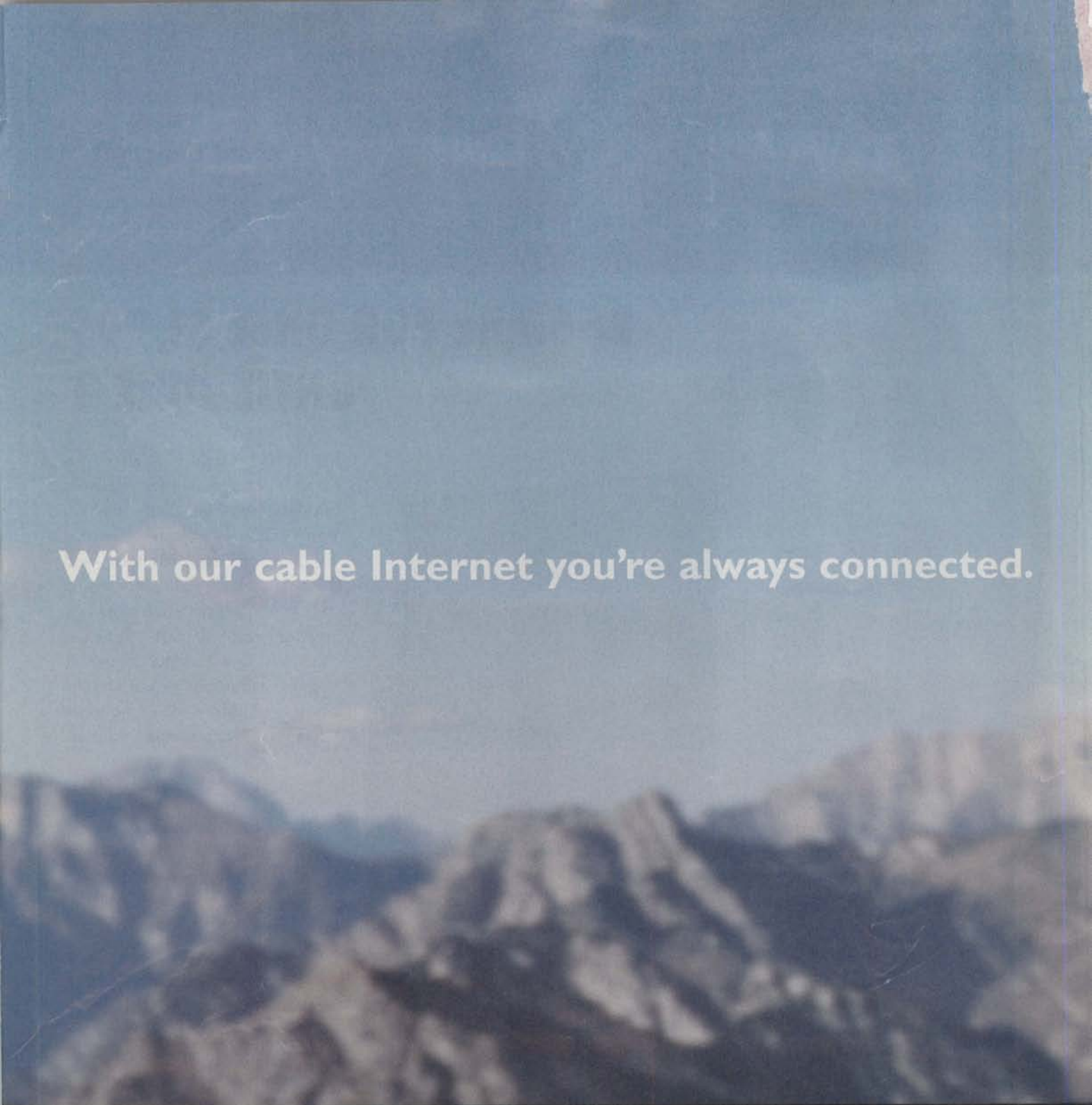
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Declaration

As with most publications in this industry, *Australian Personal Computer* magazine is regularly invited to attend international media events such as briefings, forums and conferences.

These events provide direct access to new technologies and trends, but they have no influence on *APC*'s editorial integrity.

Our policy is to openly declare all events where the cost of attendance is borne by a vendor.

APC accepted the following sponsored media trips this month.

- To Seattle, for a preview of Windows XP and Office XP (courtesy of Microsoft)
- To Beijing, for the Intel Developer Forum (courtesy of Intel)

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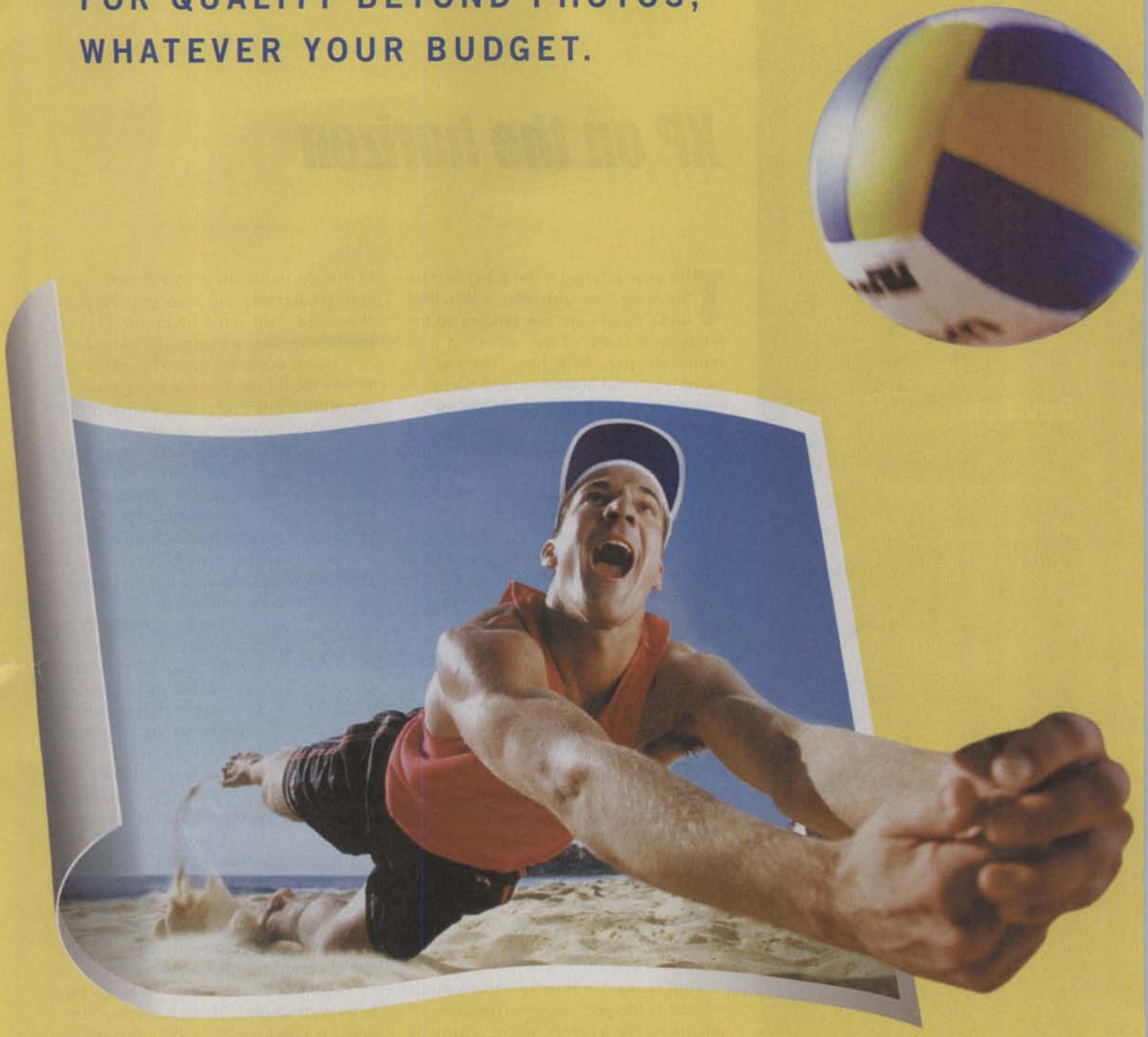
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David Flynn

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Microsoft's new XP products look promising, but convincing companies and consumers to upgrade could be tough.

XP on the horizon

This year is going to be a big one for Microsoft. Two cash cows — Windows and Office — are now grazing on the landscaped lawns of the sprawling Redmond campus. Both have enjoyed an extended period of solid, almost relentless growth, and deservedly so. On the whole, they're fine products. I've certainly enjoyed hammering away in Word 2002 (running on a beta of Windows XP) much more than I did working in the creaky Xywrite and DOS 3.3 I used in the old days.

However, the success of Office XP and Windows XP, measured in the stellar terms to which Microsoft and analysts are accustomed, will be harder to quantify.

Gone are the days when consumers would religiously upgrade with each new release of their chosen suite or operating system. A straw poll would probably indicate that uptake is now focused more on every second version, and as Office and Windows are renewed on average every 18 months, this means once every three years — roughly the same timeframe often posited for hardware upgrading. The new system and the new software won't always arrive in sync, but there can't be much of a gap between them.

Microsoft sees XP as the chance to unify enterprise-wide computing.

That's especially likely to be true towards the end of this year, because Windows XP will run best on a new PC with a 1GHz-plus powerplant, a gargantuan hard drive, BIOS-level smarts and copious amounts of RAM that will set XP soaring. It's easy to appreciate this allure when pricetags for such systems are near the $3,000 mark.

If your PC is not more than about a year old, bumping up the memory could be your best bet. Forget suggestions that Windows XP will run on 64M. If Microsoft keeps spouting this line, it may as well toss a free set of rose-coloured glasses into every box.

My advice is, don't scrimp on memory. A 128M stick of RAM costs about $100 — that's peanuts, but it will dramatically extend the usable life of your system, boost your productivity and lower your PC pain threshold. Still not convinced? Do the maths. Over two years of running Windows XP, it works out to less than $1 per week. So forgive me if I can't find it in my heart to sympathise with people who whinge about XP needing too much memory.

Selling the need for extra memory isn't the main game at Microsoft — selling the operating system is. Yes, Windows XP strikes me as a fab operating system. It's part of a compelling personal and business computing environment. It's an enabler of cool things, but building it doesn't guarantee that people will buy it.

Following softer than expected corporate demand for Windows 2000, Microsoft sees XP as the chance to unify enterprise-wide computing on a single Windows platform.

However, there are plenty of large companies getting by with NT4 and 95/98 workstations. Bearing in mind the dizzying ride IT managers have been on in the past two years — the Y2K build-up that resulted in barely a blip, and the malaise following the dot com meltdown — Microsoft shouldn't expect a crowd of suits clamouring at the doors.

Getting consumers to upgrade is going to be even tougher. To most people, 'Windows' is Windows 95 or 98 — something that crashes. Crashes aren't always Windows' fault, but the average home user doesn't know that, nor should they be expected to. How is Microsoft going to sell the absence of crashing in Windows XP to people who feel like crash test dummies?

Our preview of Windows XP beta 2 will give you a taste of what's in store with Microsoft's next operating system. *APC* is holding off the stress testing and definitive stopwatch trials until the product is ready to ship, but you can be sure that we will be here to help you make the right choice when it's time to step up or stay put.

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See a selection of the tacky PR gimmicks *APC* has been subjected to

WINDOWS XP
Great XPectations

Is Windows XP the operating system we've all been waiting for? *APC* takes a peek at beta 2.



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OFFICE XP
Office renovations

Office XP is nearing release, and soon Microsoft will be doing all it can to entice you to upgrade. *APC* examines the new package and asks, 'Is it time to give your Office an update?'.



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LINUX
Red Hat 7.1 vs Mandrake 8.0

Two new Linux distributions have just hit the streets. Both have welcome bug-fixes and new features, and are easy enough to use to tempt ordinary Windows users. Could this be Linux's big moment? *APC* finds out.



In First Take 34

CORPORATE SOFTWARE
The upgrade dilemma

You've just got everyone's desktops running smoothly, when a new version of the software is launched. Is it better to skip a release and stay with the one you have? *APC* considers your options.



In Corporate IT 119

GEFORCE3 CARDS
The hot war

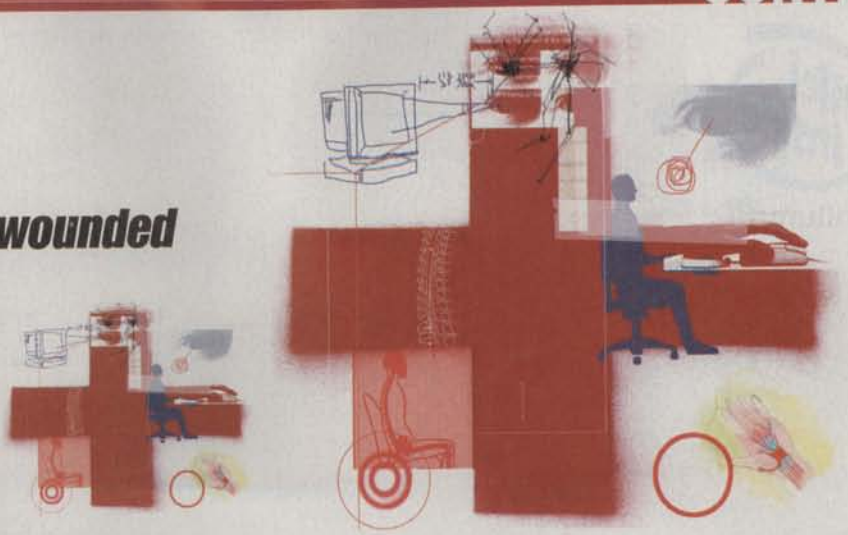
nVidia has upped the ante again in the rather unevenly matched graphics war. *APC* takes its latest GeForce3 graphics card onto the battlefield to test its mettle.



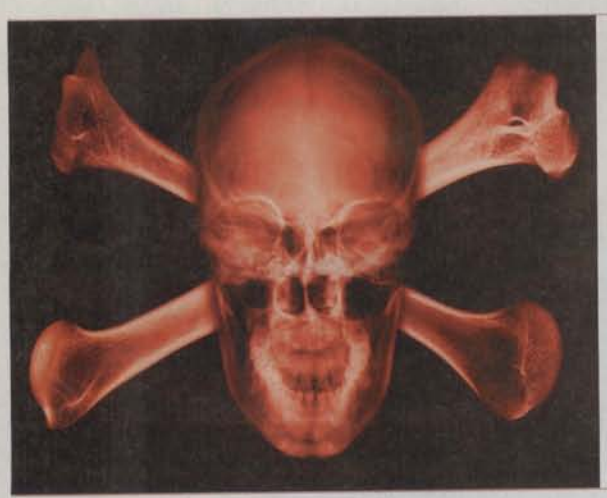
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ERGONOMICS
Technology's walking wounded

Prolonged computer use can cause all kinds of injuries. *APC* looks at what's available for minimising the risks you face using a PC every day.



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SOFTWARE IMPORTS
Software wars could benefit pirates

With the Federal Government close to allowing parallel imports on software, piracy looks set to rise. Proposed changes to the Copyright Act could halt the rise by imposing greater penalties and policing, but will the changes be approved in time?

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ONLINE CHARITY
Charity begins online

Many charities have moved online — and they're using the same devices as advertisers to get your attention. How successful are these online charities, and how can you tell which ones you can trust?



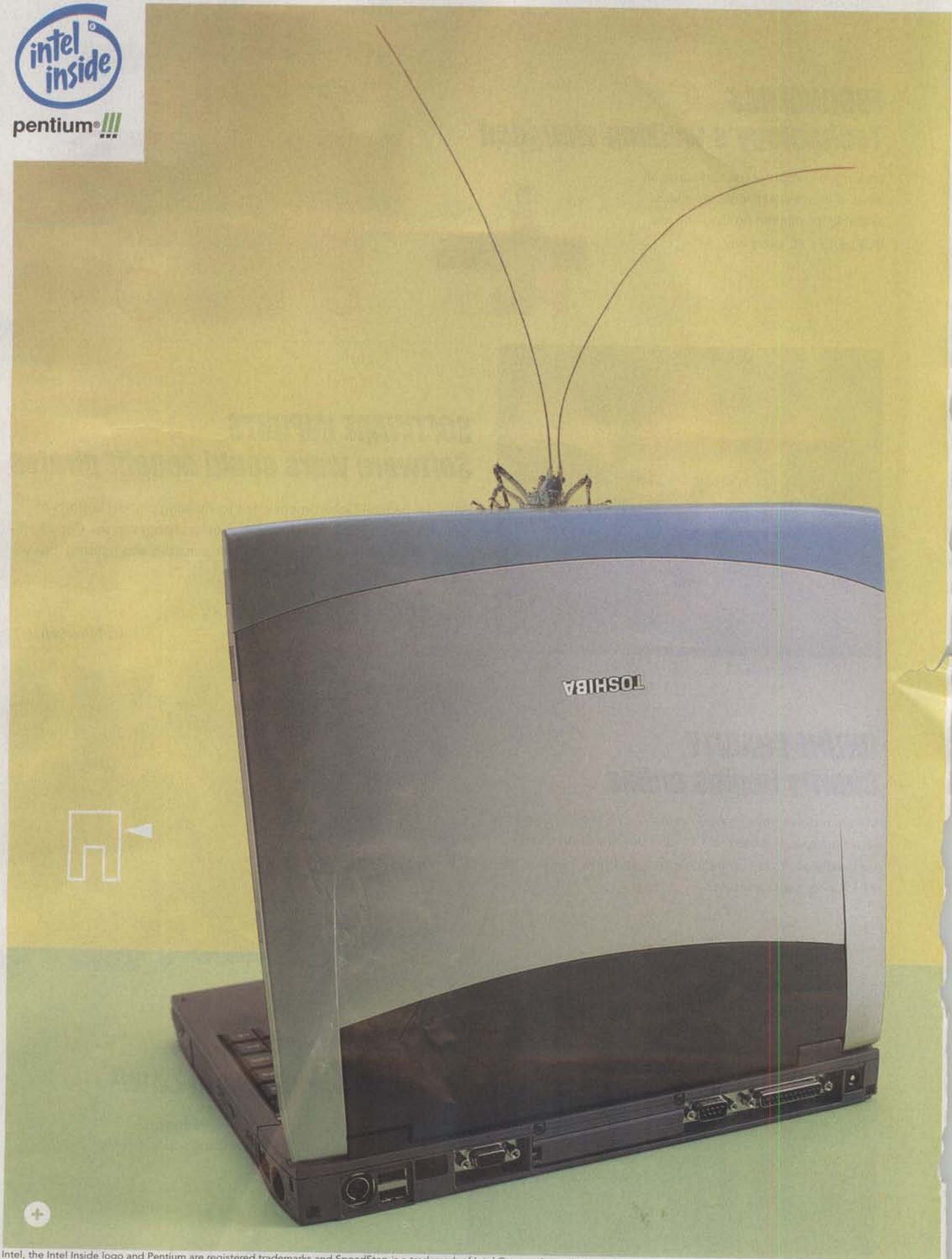
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TUCOWS PROFILE
How now, download cow?

Download network Tucows has survived against all the odds. What is the secret of the company's success? *APC* chats with CEO Elliot Noss.

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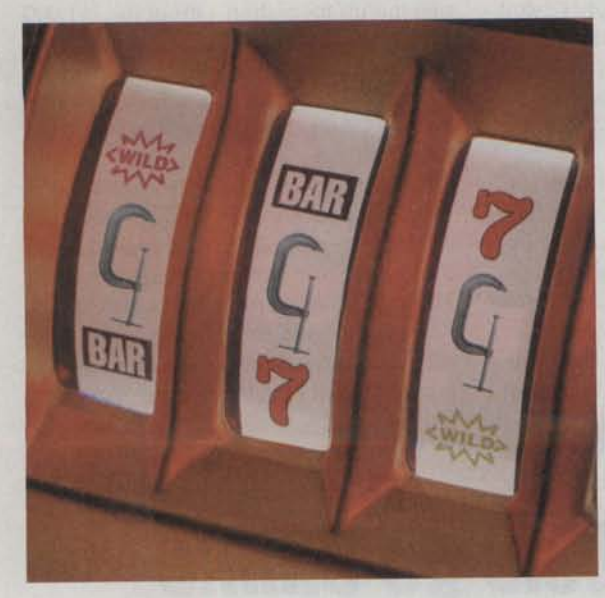
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Government starts Net clampdown

The Federal Government has stepped up measures to regulate the Internet, widening Internet content regulation and announcing plans to ban Internet gambling permanently. The Internet industry has criticised the decision, claiming that the government's attempt to step up censorship could reduce Internet access for Australians.

The decision follows a year-long moratorium on new Internet gambling services as the government investigated the effect that a permanent ban was likely to have. The proposed new laws will prevent gambling Web sites, including online casinos, lotteries and sports betting (which was exempt from the moratorium), from providing services to people located in Australia. The ban also applies to emerging interactive TV and mobile phone technology, but will not extend to telephone betting. "Nor will it apply to noncommercial activities such as office footy tipping competitions or Melbourne Cup sweeps when they are conducted over the Internet," communications minister Richard Alston said.



The new laws do allow Australian gambling providers to offer services to people located overseas. This paves the way for companies who have state or territory interactive gaming licences to set up international betting operations based in Australia. The Internet Industry Association (IIA) claims that the government is using Internet gaming as a scapegoat for existing gambling problems in Australian society.

However, there are serious doubts about how viable a ban would be, and the effect that filtering sites will have on the performance of Australia's Internet infrastructure. Under the government plan, Australian gambling providers will be responsible for blocking local players from using their sites. The government will attempt to stop Australians from using unregulated offshore casinos, using a regulatory regime similar to the complaints-based scheme administered by the Australian Broadcasting Authority (ABA), which covers all Internet content. "The regime will not result in any reduction in Internet performance," Alston said, appearing to contradict the government's own research. A report commissioned by the National Office for the Information Economy (NOIE) into the feasibility of banning Internet gambling states that "none of the technologies identified would be 100% effective at preventing access to offshore interactive services and all would have negative consequences for Internet performance."

The chairperson of civil liberties group Electronic Frontiers Australia (EFA), Kim Heitman, described the ban as "impractical" and said that the measures will not prevent Australian gamblers from gambling on either local or offshore Web sites. The government plans to create a blacklist of Web sites that will be referred to makers of Web filtering software and offered to Australians through their internet service providers (ISPs). "More and more sites will have to be blocked, and the inevitable consequence of this is a greater load on the infrastructure," he said.

According to Heitman, Australian Internet gamblers will be able to gain access to blocked Web sites by using services such as an 'anonymiser'. An anonymiser is a proxy server that encrypts any Web site you access, so anyone trying to block or track a request will only get as far as the anonymiser's server. "There is no difficulty at all in using these services and the ban will just create a bigger market for these products," he said.

In April, the ABA released its second report on Internet regulation, which showed an increase in the number of notices issued to Web site operators ordering them to remove content, and in the number of site operators and sites referred to Internet filtering software makers. The ABA received 290 complaints about Internet content in the six months to December 31, a 44% increase on the previous six months. About 75% of the sites involved "offensive depictions of children". Most of these sites were hosted overseas, with 80% located in the US. The ABA referred 105 overseas items to the Australian Federal Police.

For content hosted in Australia, the ABA referred 45 items to State police. However, Heitman said that only six Web sites ended up being prosecuted by State police. "The results show that the government is mistaken in believing it can build a wall around Australia," he said. "The government has to realise that the Internet is a global medium that cannot be regulated from Canberra." Under the regime, the ABA merely refers sites to police and notifies Web filtering software makers. Heitman said this type of regulatory regime just adds another layer of bureaucracy to the Internet. He said that only 2% of Australian Internet subscribers choose to use filtering software, while 98% preferred to rely on their commonsense.

William Maher

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News roundup

3G close at hand

Optus plans to launch a third-generation (3G) mobile phone network by the end of next year. The new technology will deliver high-speed Internet, audio and video services to Australians for the first time. Optus has signed a $900 million financing agreement with Nokia to build the network and conduct ongoing research into 3G application and content development over the next seven years. Optus plans to build 3G network infrastructure throughout its existing 2,500 mobile phone base stations in stages. Optus Mobile managing director Paul O'Sullivan said the timetable for a national 3G network rollout will depend on the popularity and cost of the new technology. Telstra has indicated that it will not launch a 3G network until 2004, while problems have beset the launch of the world's first 3G network. Japanese telco NTT DoCoMo was due to launch the network in May, but ongoing software glitches have derailed the project for another five months.

IBM strikes out

Angry workers at IBM Global Services Australia have staged a protest outside IBM's Sydney headquarters over plans to lay off 64 workers. Staff in Melbourne and Sydney walked off the job in response to the cutbacks, and only came to an agreement with IBM after taking their fight to the Industrial Relations Commission. Community and Public Sector Union representative Priya Carey said IBM staff and many other workers in the IT industry are concerned about the difficult working hours and poor management practices prevalent in the industry. IBM agreed to transfer 16 of the affected staff, and plans to substitute the rest of the workers with outsourcing services from JAV IT. However, the proposed 16 positions are all located interstate and staff members claim that they were only given 14 days to accept the transfer.

PC retailers close doors

Two major Australian PC retailers have closed their retail outlets, as PCs bear the brunt of the global economic downturn.

Compaq has closed eight of its Compaq Connect shops, with only one remaining open under independent management. Almost 50 staff have been laid off. The company blamed poor economic conditions.

Buzzle, Australia's biggest Apple retail chain, was placed in the hands of receivers after accumulating $30 million in debts during its first six months of operation. At the time of writing, six shops (two in Victoria, one in Brisbane and three in Sydney) had been closed, and staff relocated or laid off. The remaining Buzzle retail outlets now operate under the control of administrators from accounting firm KPMG, who are searching for a buyer for the group. Remaining staff have been given mixed signals about their future. Some were told their jobs were secure, but others were warned to await the decision of the administrator.

Buzzle formed in September last year, when six Apple resellers merged to create Australia's largest network of Apple retail outlets — 24 of the 68 were in the country, representing about 40% of Apple's retail sales in Australia. Buzzle executives immediately splashed out on a public relations campaign, and planned to raise cash by floating on the Australian Stock Exchange before the end of the year.

However, a combination of slow PC sales, tough stock market conditions, poor management, and reportedly unreliable accounting and stock management procedures led to the collapse. Buzzle was launched just before Apple suffered a major sales slump that plunged it to a $US247 million loss for the December quarter. In an effort to offload old stock, Apple slashed prices on some hardware. These troubles did



not make the company more sympathetic to Buzzle's woes. Apple Australia reportedly insisted that Buzzle be placed in receivership, so it could recover some of the $20 million it was owed as quickly as possible.

Apple has since recovered from the slump but has warned of depressed sales for the next six months. Desktops and iMac sales performed poorly during the March quarter, but the new PowerBook sold well, making up more than 15% of the 751,000 Macs shipped. Compaq is also anticipating tough times and has announced plans to shed 7,000 staff after its position as the top selling PC maker was usurped by Dell in the March quarter.

The collapse of many of its retail outlets in Australia has forced Apple to rely more on Internet sales, which accounted for one-third of its sales during the March quarter. The local situation mirrors events in the US, where major Apple reseller ComputerWare collapsed at the same time as Buzzle. Compaq will also focus on independent resellers and Interent sales.

Fiona Angus

Record labels go online

Despite ongoing legal battles with music-sharing service Napster, three major record labels have committed to online sales.

EMI, AOL Time Warner and Bertelsmann will open their music catalogues to Internet sales through a co-owned 'clearing house' called MusicNet. Third-party music distributors will pay MusicNet for digital music that they can sell to consumers over the Internet.

MusicNet will depend on software company RealNetworks to comply with piracy concerns, but it's still not clear which file formats will be used and exactly how the service will deliver music. Web sites can choose how they package and deliver music to listeners, possibly even using Napster's infamous peer-to-peer file sharing method.

In July, Napster hopes to prove that its piracy problem is under control and that it has devised a way to charge members. MusicNet said that if this goes to plan, it may open its catalogues to Napster.

William Maher



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News roundup

ABNs go digital

Australian businesses can now use their Australian Business Number (ABN) as a digital signature for electronic transactions. The Federal Government has granted digital certificate provider eSign the authority to issue Australian Business Number Digital Signing Certificates. Businesses can use their digital ABNs to validate electronic transactions with any federal government agency. The National Office for the Information Economy (NOIE) is working on extending the digital ABN to State government services and then to a 'single online identity' for all business transactions. Federal government agencies will also accept bank-issued digital certificates.

Talisker beta in hand

The next version of Microsoft's Windows CE operating system for handheld devices has been released to beta testers. Codenamed Talisker, the new version includes improved data security and passport and messaging tools — key elements in Microsoft's strategy for tying its software to the Internet. Talisker will eventually include built-in support for the Bluetooth standard for exchanging data without cables. Microsoft recently revealed that it won't include native Bluetooth support in the upcoming Windows XP, saying that the wireless standard wasn't ready. A commercial version of Talisker is due for release late this year.

Handheld squeeze

Palm, maker of the world's most popular handheld, posted a shock $US1.9 million loss for the three months to March 2, and warned of slow sales over the coming months. Handspring, maker of the Visor, the second most popular handheld, also warned of slow sales after posting a $US6.7 million loss for the same period. However, Compaq has reported unprecedented demand for its iPaq handheld. It announced that it has increased production of iPaqs, and in April it released the H3660 iPaq in Australia, which boasts 64M of memory — double that of the previous model.

Chip makers on trial

The computer industry's latest legal trial has begun — and this time it's memory chip manufacturers who could lose out.

The first of several trials has begun overseas to determine whether chip manufacturers must pay royalty fees to produce SDRAM memory chips. SDRAM is found in most desktop computers, and some say the royalty fees could total billions of dollars.

The company requesting the royalties is Californian chip designer Rambus. It has already convinced many major manufacturers to pay royalty fees for SDRAM, and wants the same to happen for DDR RAM, a new version of SDRAM.



If Rambus wins, the three manufacturers disputing the claims — Micron, Hyundai and Infineon — will join the growing list of manufacturers paying royalties to Rambus. If Rambus loses, it could lose the agreements it already has with other chip makers.

The trials, which will take place in several countries, relate to patent applications filed by Rambus as early as 1990. The SDRAM standard wasn't agreed on until later that decade, but Rambus argues that these earlier patents apply to the technology. Rambus's opponents have pointed out that the company failed to mention its earlier patents during the formal proceedings to set the SDRAM standard.

If the royalties are imposed, it will also be a blow for computer manufacturers resisting pressure to switch to Rambus's new memory technology, RDRAM. The chip format hasn't been treated kindly by the industry, because it is much more expensive than SDRAM.

Intel has taken sides with Rambus, and has made RDRAM a requirement in new Pentium 4 computers. The move has attracted a lot of scepticism, and Intel has decided to allow other memory types for its next Pentium 4 chipset in 2002.

Intel rival, AMD, has reportedly been promoting DDR DRAM as an alternative to RDRAM, but this approach could be less attractive if DDR DRAM royalty fees are enforced. DDR DRAM is used in graphics cards, as well as in other components used by chip company Transmeta.

Sydney-based Gartner analyst Andy Woo was negative when asked about the possible impact of the Rambus trial. "If they win, at the end of the day the greatest losers will be the wider semiconductor industry," he told *APC*.

William Maher

Internet bankers queue up

The Internet was meant to herald the end of the bank queue, but one Australian bank has managed to re-create the tedious wait online.

During peak Internet banking periods, National Australia Bank (NAB) customers are forced to wait in a virtual line before gaining access to their accounts. "National Internet banking is currently experiencing an increase in usage levels. The current login time is between one and five minutes," a pop-up message tells customers as they attempt to log on. "We apologise for any inconvenience caused."

Unlike waiting in a branch queue, Internet banking customers have to pay for Internet access as they wait. According to NAB head of Internet and eSolutions Blair Vernon, the warning was introduced in early April after customers indicated they wanted to be informed if they were in for a long wait. "The delay is caused by the sheer number of people using the system and the kinds of transactions they are completing," he said. The NAB has 400,000 Internet customers, and the congestion tends to occur during weekday lunch hours, according to Vernon.

The NAB is the only major bank that does not have a browser-based online banking facility. Customers must install software on their PC before they can use Internet banking. Vernon confirmed that NAB will launch a new browser-based system by June. "We are in the closing stages of testing," he said. The bank with the most online customers, the Commonwealth Bank, has so far avoided introducing queues and uses a browser-based system.

Fiona Angus

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News roundup

Indrema nightmare

The Indrema set-top box was a dream come true for Linux lovers; a box that plugged into the television and played Linux games, MP3s, DVD movies and provided Internet access. It really was too good to be true. The company behind the project has announced that it could not secure enough funding to continue the project. The fate of games being developed for the platform may rest on attempts to sell the Indrema technology. Despite the bad news, some developers who were interested in Indrema have begun another project: to build a Linux console, called the TuxBox.

Outsourcing concessions

The Federal Government has made key concessions to its controversial IT outsourcing policy, allowing individual agencies more freedom to choose their own outsourcing arrangements. It has released details of a new framework outlining how government agencies select IT outsourcing providers. The framework provides more scope for smaller outsourcing companies to bid for government contracts, instead of allowing multinational providers to dominate the sector. The concessions come after a parliamentary investigation and a report by the Australian National Audit Office found that some government departments were forced to pay more for outsourced IT providers, while a number of departments suffered key system breakdowns.

Historic hard drive sale

Quantum has stopped making hard drives after more than two decades in the business. The company has merged its hard drive business with rival storage company Maxtor in a deal worth somewhere around $US150 million. The Californian-based Quantum had $1.4 billion in annual sales and 3,000 employees prior to the merger, but it now plans to focus on high-end storage products and services. The merger makes Maxtor the world's largest hard drive maker.

Return of the tablet?

Bill Gates is pushing the tablet computer again. This cross between a PDA and a notebook has been Gates's pet project for years, but has consistently failed to get off the ground.

Previous attempts by various PC makers, including Apple and Acer, to sell tablet PCs have all been spectacular failures. Gates tried to launch a tablet PC in the early '90s with a similar lack of success. Now Microsoft says it will have a tablet PC on the market next year.

With the falling demand for PCs and the explosion of notebooks and PDAs, Gates considers the time is right for the much-maligned tablet. Microsoft has secured agreements from Compaq, Acer, Fujitsu, Sony and Toshiba to manufacture the hardware, and Intel and Transmeta have both indicated a willingness to produce chips for the machines. Microsoft plans to ship the final product with Windows XP Professional.



▲ Microsoft's prototype Tablet PC looks suspiciously like Apple's iBook.

Gates displayed a prototype of Microsoft's Tablet at the annual Windows Hardware and Engineering Conference. The Tablet is about the size of an A4 sheet of paper, two inches thick, with an LCD screen and a pen-based input device. According to Microsoft, "Tablet PCs combine the simplicity of paper with the full power of the PC." The main benefit of the Tablet is its ability to edit documents and surf the Web on a mobile platform with a pen. The prototype is similar to previous tablets, only more powerful. The final model is expected to cost about the same as a high-end notebook, have 128M of RAM, a 10G hard drive, a docking station with mouse and keyboard, and wireless Internet access.

Gates described the tablet experience as "profound", and flagged further developments in digital ink and voice recognition technology. Will Gates's latest attempt to launch a new era in tablet computing prove successful? Developments will be followed keenly by PC users everywhere.

William Maher

Ten years for IT crimes

Privacy groups in NSW are up in arms over the possibility that some computer activities will be covered by criminal law.

The changes, outlined in a report by the NSW Law Reform Commission and discussed in the NSW Parliament, reportedly expand the Crimes Act to cover offences such as hacking into corporate networks and spying on private email. Possible penalties include a maximum of 10 years in jail.

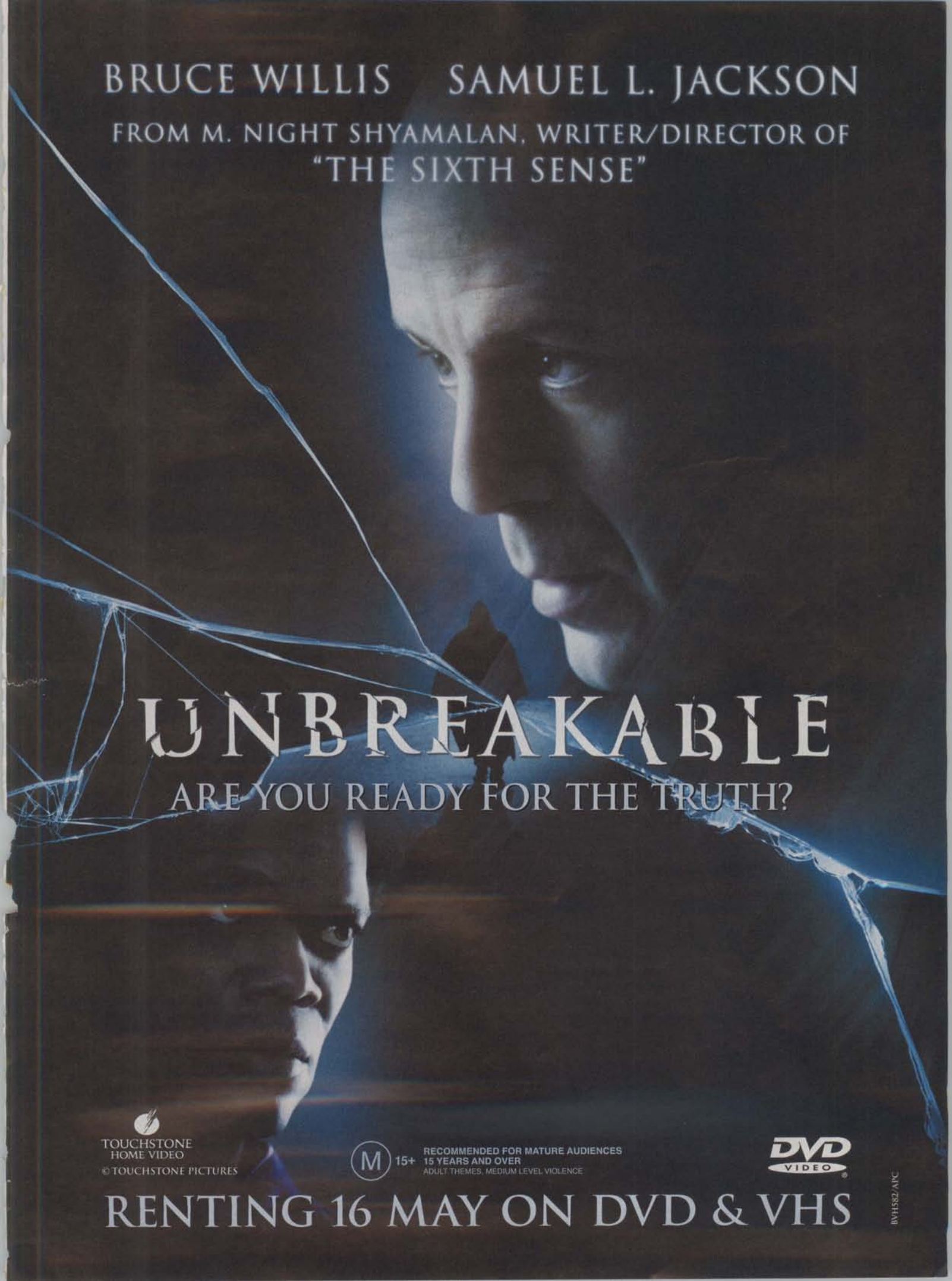


At the time of writing, the proposed laws were still to be approved by the NSW cabinet and had not passed through parliament. When contacted by *APC* for a copy of the report, a Law Reform Commission representative said the document was with the Attorney General and could not be released yet.

Privacy groups were particularly horrified by suggestions that employers would be allowed to spy on office emails after gaining consent from workers or an order from the Industrial Relations Commission. Among those reportedly opposed to the rule is the Australian Council of Civil Liberties.

Almost all serious attempts to police computer activities have struck fierce opposition in Australia. This includes the Broadcasting Services Amendment (Online Services) Bill 1999, designed to deal with online pornography, and the Federal Government's proposed ban on Web gambling.

William Maher


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A new campaign pits the world's largest software companies against the Australian government.

Software wars open doors to pirates

The battle for the hearts and minds of Australian software users is intensifying in the lead-up to this year's federal election. Two separate changes to the Copyright Act are being considered that could have a profound effect on Australian software consumers and distributors. As the battle rages, software companies fear a flood of pirated software will enter Australia over the next 18 months.

The proposed 'parallel imports' amendment would allow Australian retailers to import software independently of software makers, breaking the software companies' monopoly on distributing their titles in Australia. The government is due to put the legislation before Parliament in the next few months, and the changes could see software prices fall soon after. The second change involves recommendations made by a parliamentary committee to increase copyright enforcement and penalties for possessing pirated software.

Robert Holleyman, the president of the Business Software Alliance (BSA), an international lobby group representing the software industry, visited Australia recently to drum up opposition to parallel imports and support for stronger copyright enforcement. The government remains committed to parallel imports, but according to Holleyman, the Labor Party and the Democrats are still considering their positions. Following his discussions with them, he said that the path of the proposed laws in the senate "will not be smooth".

The BSA is up against Australia's most powerful consumer watchdog, the Australian Competition and Consumer Commission (ACCC). The ACCC has openly attacked the software multinationals for the prices they charge Australian consumers, and spearheaded the move to allow retailers to independently import products at cheaper prices.

The local arm of the BSA, the Business Software Association of Australia (BSAA), is trying to convince consumers that they will be worse off under the new laws. The BSAA began a public relations campaign to win public support with a 60-day 'truce', inviting people to register illegal software without risk of legal action. The BSAA has only eight members (Adobe, Apple, Autodesk, Mac-romedia, Manufacturing and Management Systems, Micrografx, Microsoft and Symantec), but it claims to represent 90% of the local software market. Heading the campaign is BSAA chairperson Jim Macnamara, who is also the president of the Public Relations Institute of Australia. "We do not see that a major reduction in prices will occur," he said. "We're saying that our prices are competitive right now."

However, the government knows that the prospect of cheaper software will win the support of voters, and it is significant that communications minister Richard Alston did not grant Holleyman an interview. On the same day that the BSAA announced the truce, the ACCC reaffirmed that software prices would be on the way down if the laws went ahead.



Who should consumers believe? The BSAA claims Australians pay only 3.5% more for software than US consumers, but the ACCC insists that we pay 27% more than US consumers. Similar laws allowing the parallel importation of CDs were introduced in 1998. There has not been a dramatic fall in CD prices, but the ACCC claims there has been a downward trend. More worrying for software companies was the ACCC's successful court action against Sony, after the electronics giant was caught threatening to withdraw trading benefits from local retailers who stocked parallel import products.

The BSAA claims that parallel imports will lead to a flood of pirated software. Research shows 32% of software in Australia is pirated, compared to 25% in the US. The BSAA fears that if the parallel imports legislation is passed by parliament while the copyright enforcement recommendations are not in place, an environment perfect for pirates would result. "The worst case scenario is that the parallel imports laws will slip through before the election without the copyright enforcement laws passing," Macnamara said. "That would be disastrous for us."

The BSAA investigates over 900 cases of piracy each year, but pursuing pirates is often too costly and arduous for software companies. "In most cases, there is no legitimate challenge," Macnamara said. "Mostly, what we see are companies that are sloppy and don't pay attention when employees copy software over to new machines." The BSAA advocates firing workers who copy software. It has also called on the government to devote more resources to training Australian Federal Police officers to catch high-tech criminals.

It also wants to make the possession of pirated software a criminal offence for individuals. Until now, the BSAA has focused on renegade distributors and commercial users. A BSAA survey revealed that most pirates do not expect to be caught.

Current software and Internet users will determine future attitudes about the commercial value of intellectual property, Holleyman argues. Individuals must decide whether they respect intellectual property rights and are willing to pay for good ideas. He said that Australia risks becoming a second-class player in the information economy if new technology is not protected. "Countries that have stronger intellectual property laws have a healthier software industry," he said. "The government has a responsibility to provide legal protection — Australia can't be the Wild West of copyright."

Macnamara said that security is only part of protecting intellectual property, and to defeat piracy, software makers must gain the support of consumers through education campaigns (such as the truce). However, he said education can only go so far, and after the truce ends on June 30, "all bets are off".

Fiona Angus

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Does Java have a place in Microsoft's Web services strategy?

Microsoft poses new threat for Java

With Microsoft stepping up the campaign to sell its .NET software strategy, questions are being raised about what it means for competing technologies such as Java. Does Java have a place in Microsoft's .NET world, where software is delivered through the Internet using Microsoft technology? Is Microsoft trying to undermine Java with this new platform?

The answer has become clearer over recent months, most notably with the unveiling of Hailstorm — one of the first tangible pieces in the .NET puzzle. With Hailstorm, personal details of consumers, such as addresses and credit card payment details, can be stored in a central location. The Hailstorm code would then allow third-party programs to access that data. The concept could be used to make money from the Internet, and has also landed Microsoft in hot water with piracy advocates.

Some of the third-party applications won't reside on desktop computers, but will be delivered through the Internet. By now, Microsoft should also have unveiled an Internet 'directory' for finding these programs — known as Web services. The directory will use some of the key protocols in Microsoft's .NET vision; protocols that, in some cases, Microsoft has played a leading role in developing.

Microsoft is readying teams of programmers to build Web services that will work with its own products, such as Encarta and Money. Windows XP will also have built-in support for Hailstorm, and in the future, Microsoft will sell versions of programs such as Office, delivered through the Internet.

All this will have direct implications for Java programmers. Indications are that Microsoft wants .NET services built using its new software language called C#. This language has direct similarities to Java, which Sun introduced in 1995 as part of its own push to have software delivered online to any platform.

What does this mean for Sun and Java?

At first glance, the gap between Microsoft technology and Java seems to be disappearing. In January, Microsoft settled a long-running lawsuit with Sun, after Sun claimed Microsoft had altered its implementation of Java so applications would only run in Windows. Microsoft lost its official Java licence, but it can continue incorporating Java into existing products for seven years.

Meanwhile, some Sun and other Java supporters have indicated that they will get behind key protocols in Microsoft's .NET strategy, including the SOAP protocol. This protocol allows Microsoft code to communicate better with Java and other languages.

However, there are others who aren't so sure. Research group Gartner points out that while elements of .NET such as C# have been opened up to public standards bodies, others remain proprietary. This includes the fundamental components for building system software to run in the .NET framework.



Microsoft is also trying to convince Java programmers to make the move to C#. Microsoft has produced a tool that converts Java code to C#, and several other tools that allow projects using the Java language to work in the .NET platform. Microsoft has called this the Java User Migration Path to .NET (JUMP to .NET). Gartner is already tipping a stoush between Microsoft's programming tools and Java-oriented tools from Borland, Oracle, Sun and IBM.

Despite the push behind C#, the language is still new, and for that reason, it won't become popular in enterprise environments anytime soon. According to Gartner, most companies involved in Web services will be exposed to both Java and Microsoft technology over the next few years. Java is particularly favoured for large-scale application servers.

Anders Hejlsberg, creator of C#, agrees. Referring to the fledgling Microsoft language in a recent interview, he said, "Companies don't bet on beta releases."

If Java and C# will both be used for Web services, the question is how will the two work together? Gartner research suggests this could be a stumbling block for Java developers. "There are almost no standards in the application integration field," a Gartner paper stated late in 2000.

However, some small headway has been made. The latest version of Java (J2EE) includes special components to connect legacy interfaces. Sun has also indicated that XML messaging technology (a key .NET component) will be included J2EE in the future.

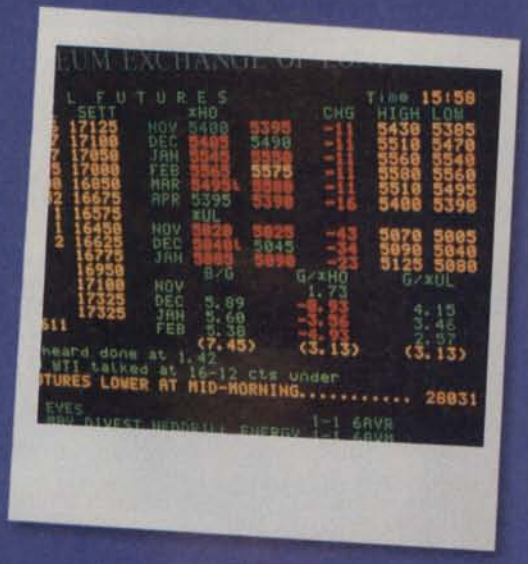
Will Java-based Web services work with systems running the .NET platform? In theory, the answer is yes, but in Gartner's view, Microsoft will not be providing any help for this. "Microsoft's real aim here is removing the need for Java," a Gartner report stated in April.

Whether Microsoft, Sun and other software manufacturers come to new agreements on integration remains to be seen. Gartner believes that, in the meantime, the choice of programming models will still be "difficult and proprietary".

William Maher



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Comparisons with other web hosters as taken from their websites on 24 April 2001

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Company	ilisys	Ozemail	Web Central	Net Registry	Telstra
.com .net .org	$40	$66	$66	$110-$137.50	Not Offered
.com.au	$110	$135	$135	$140	$330

Entry-level domain hosting packages (lowest price domain hosting packages detailed on each company's web page on 24/04/01)

Company	ilisys	ilisys	Ozemail	Web Central	Net Registry
Hosting package	lite	basic	Economy	Economy	Promoter
Server space	5MB	20MB	20MB	20MB	35MB
Monthly transfers	500MB	1 GB	500 MB	500 MB	1 GB
Domain name .com	$40 for 2 years	$40 for 2 years	$66 for 2 years	$66 for 2 years	$110 for 2 years
Set up fee	0	0	$64	$64	$108.90
Cost of basic package	$120	$199	$420	$420	$382.80
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Company	ilisys	Ozemail	Web Central	Net Registry	Telstra
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Server space	50MB	70MB	70MB	50MB	75MB
Monthly transfers	1 GB	750 MB	750 MB	1.5 GB	1GB
Domain name .com	FREE	$66 for 2 years	$66 for 2 years	$110 for 2 years	$330 (.com.au- for 2 years)
Set up fee	0	$97	$97	$108.90	$110
Cost of basic package	$399	$665	$665	$778.80	$1320 ($110/month)
Total including GST.	$399	$828	$828	$997.70	$1760

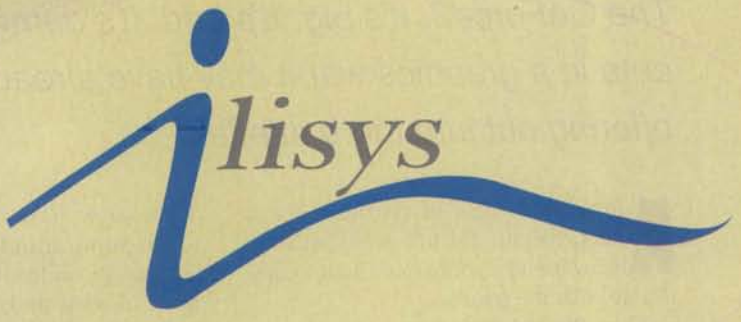
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The hot war

The GeForce3. It's big. It's bad. It's damn expensive. It's nVidia's attempt to up the ante in a graphics war it may have already won. ***Daniel Gardiner*** *takes the latest offering out into the battlefield.*

After the demise of its main rival, 3dfx, nVidia did not even pause to draw breath before once again coming up with the goods.

Over the last few years, programmers have been making steady progress and expanding the graphical capabilities of games, but the technology behind graphics cards hasn't exactly been mind blowing. They get bigger and faster, and new technologies have been added, but essentially, it's been slow going. Each successive generation has added a couple of new features, but fundamentally the focus has been on refining the existing technologies. However, nVidia's latest card promises to be more than just another run-of-the-mill upgrade.

The GeForce3's feature set is astounding. With the exception of its 200MHz clock speed, a basic GeForce3 appears to have many of the same characteristics as a high-end GeForce2 Ultra: 350MHz RAMDAC, 64M of DDR RAM running at 460MHz, and VGA, DVI and S-Video outputs. Beneath this humble veneer, the chipset hides an awesome array of new technologies. The chipset, codenamed the NV20, consists of 57 million transistors. That's effectively twice as much raw computing power as a GeForce2. However, its main selling point is the group of technologies that nVidia is calling the 'nfiniteFX engine'.

This comprises two specific new technologies: vertex shaders and pixel shaders. These allow 3D designers to do some mind-boggling tricks, and are at the heart of what makes the GeForce3's NV20 chipset such a milestone.



The programmable vertex shaders allow for some amazing real time manipulation of 3D objects. Currently, most 3D objects and environments in games have limited, static functions due to the computing power required to render images more realistically and lifelike. The most impressive 3D renderings are usually only seen in cut scenes. This is due to the fact that when game designers are creating the video, the number crunching is not done in real time. It can take many hours, or even days, to create more complex scenes.

For most complex 3D objects to be rendered, they are first transformed into a series of interlocking triangles. These fit together like a 3D jigsaw puzzle. The corner points of the triangles are called vertexes, and these are the most basic components of 3D design. Each vertex has specific properties, such as X, Y and Z coordinates in 3D space, and colour and texture values. The vertex shaders alter the properties of a vertex in real time. This means that individual vertexes can be moved to a different point, become transparent, change colour and much more. This will allow much more complex facial animations, weapon and spell effects, and realistic, fluid body and fabric movement. It essentially makes the 3D environment much more malleable.



The most significant advance is the addition of programmability. Previously, developers were fairly restricted when it came to vertex manipulation. Under DirectX 8, designers can write their own vertex operations and manipulate them more directly, making effects much more varied and unique. This is not exactly a new technology, but the pixel shaders on the GeForce3 are a considerable step up from those on the GeForce2. They can process twice as many simultaneous requests as their predecessors. This means, for example, that developers can do much more when they are applying ingame changes to texturing and lighting. Bump mapping (which uses multiple overlapping textures to make a 3D object's surface appear more realistic) should also be greatly improved. The GeForce2 could combine two textures simultaneously for bump mapping, but the GeForce3 can combine up to four, which allows for much more detail. Like the vertex shaders, pixel shading is fully programmable, allowing designers to customise to their hearts' content.

An old 3D processing problem has been solved by the addition of something called the Lightspeed Memory Architecture. The amount of detail in a PC game is often restricted simply by the data transmission. Transferring graphics data from a 3D card's memory to the GPU is the main restriction. The memory bus of the GeForce2 design was

limited to a single 128-bit pathway, through which all data had to pass. Each instruction must pass through the memory bus on its own, regardless of size. The GeForce3 has modified this structure so that it has four 32-bit pathways. This allows it to stream the same amount of overall data (128-bit) from the memory to the GPU, but numerous smaller operations can pass through simultaneously.

nVidia has come up with new developments in the past, but these have taken a long time to catch on. For example, the GeForce 256 could calculate geometry transform and lighting (T&L) on hardware, which impressed a great many people when it was released in 1999. However, the lack of support for the feature at the time meant that its use was reasonably limited. Software has to be designed specifically to make use of hardware T&L. Most games up until then had been written to cater to software T&L (done by the computer's CPU), because there was simply no alternative. As a significant percentage of gamers don't own a GeForce 256 or above, the card's ability to do hardware T&L was considerably underutilised until recently.

Microsoft's Xbox should prevent this from happening to the GeForce3. The Xbox apparently uses the NV20, the same chipset as the GeForce3, so it will have much the same capabilities. The machine is also heavily dependent on DirectX 8, and a large number of developers are already working on titles for the system. Much of this knowledge and enthusiasm will undoubtedly spill over into the realm of PC development, as programming a game for the Xbox has a lot in common with programming one for the PC.



The GeForce3 is a great piece of hardware. nVidia is well ahead with this one, once again proving why it's at the top in the world of 3D graphics. However, being ahead of your time has its pitfalls. Like most of nVidia's other cards when they were first released, the price puts it out of range for all but the most fanatical gamers.

WinFast GeForce3 TD vs Hercules 3D Prophet III

It's always difficult to test the first in a new generation of 3D cards. The only thing you can really test it against is the previous generation, so it's difficult to gauge where it sits among its real peers. With this in mind, we benchmarked a stock-standard 32M GeForce2 GTS to measure the major differences between it and two GeForce3 cards supplied by Guillemot and Leadtek.

The specifications for both GeForce3 cards are identical. Both come with 64M of DDR RAM running at 460MHz, a core clock speed of 200MHz, and they have VGA, DVI and S-Video outputs. The core speed of these cards is significantly lower than the 300MHz suggested by most of the early reports, or even that of a GeForce2 Ultra, which runs at 250MHz. This means that in low-resolution tests, the GeForce3 often underperforms compared to a GeForce2 Ultra. This reflects the new chip architecture to some extent, and its strengths and weaknesses in overall rendering. Where the GeForce3 really starts to show a significant increase (and where it really counts) is at very high resolutions. We benchmarked all the cards on a Pentium 4 1.5GHz with 128M of RAM and a 40G Ultra ATA hard drive. In the Quake 3 Demo, the GTS rapidly drops from 99fps at 1,024 by 768 to 37 fps at 1,600 by 1,200. The GeForce3, on the other hand, screams along at about 155fps at 1,024 by 768, and manages to maintain a remarkable 80fps at 1,600 by 1,200.

The all-important 3DMark 2001 benchmarks (which use DirectX 8 and specifically utilise some of the NV20's new hardware features) show that the GeForce3 cards well and truly outperform the GeForce2 GTS. We've included the full benchmarking results on this month's cover CD.

In the head-to-head contest between the WinFast and Hercules GeForce3 cards, the benchmarks were so close that they might as well have been the same card. Based on price and software alone, the $999 WinFast is the better buy, but the Hercules can be picked up for well under its $1,199 price tag on several online shopping sites.

Currently, the GeForce3 steamrolls all the competition. You can play most of today's 3D games at extremely high resolutions with all the details turned on. That this ability comes at a high price should surprise no-one. Slot one of these into your system and you'll be set up for at least the next couple of years. As yet, there are no games on the market designed specifically to take advantage of the new features of the GeForce3. It will probably be at least six to 12 months before a large number of games utilise the onboard vertex and pixel shaders. Considering that you can get a GeForce3 for only $50 more than a GeForce2 Ultra, it's a good investment if you absolutely must have the latest and greatest.

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Pros Speediest graphics cards around . . .
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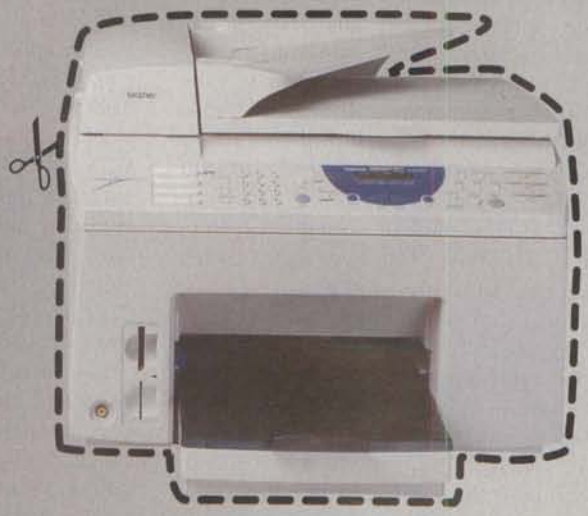
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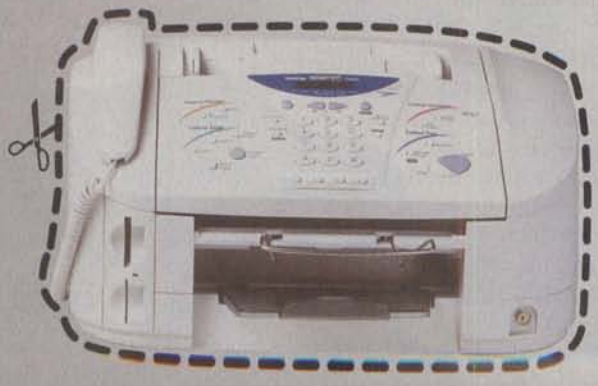
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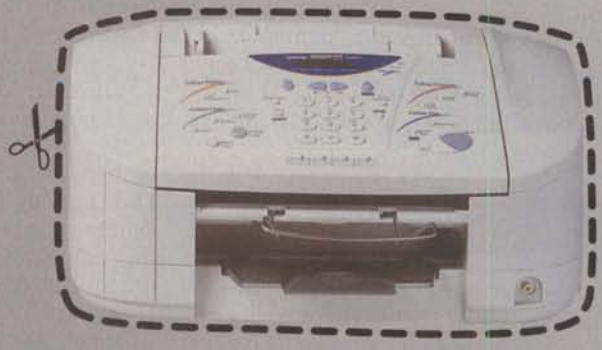
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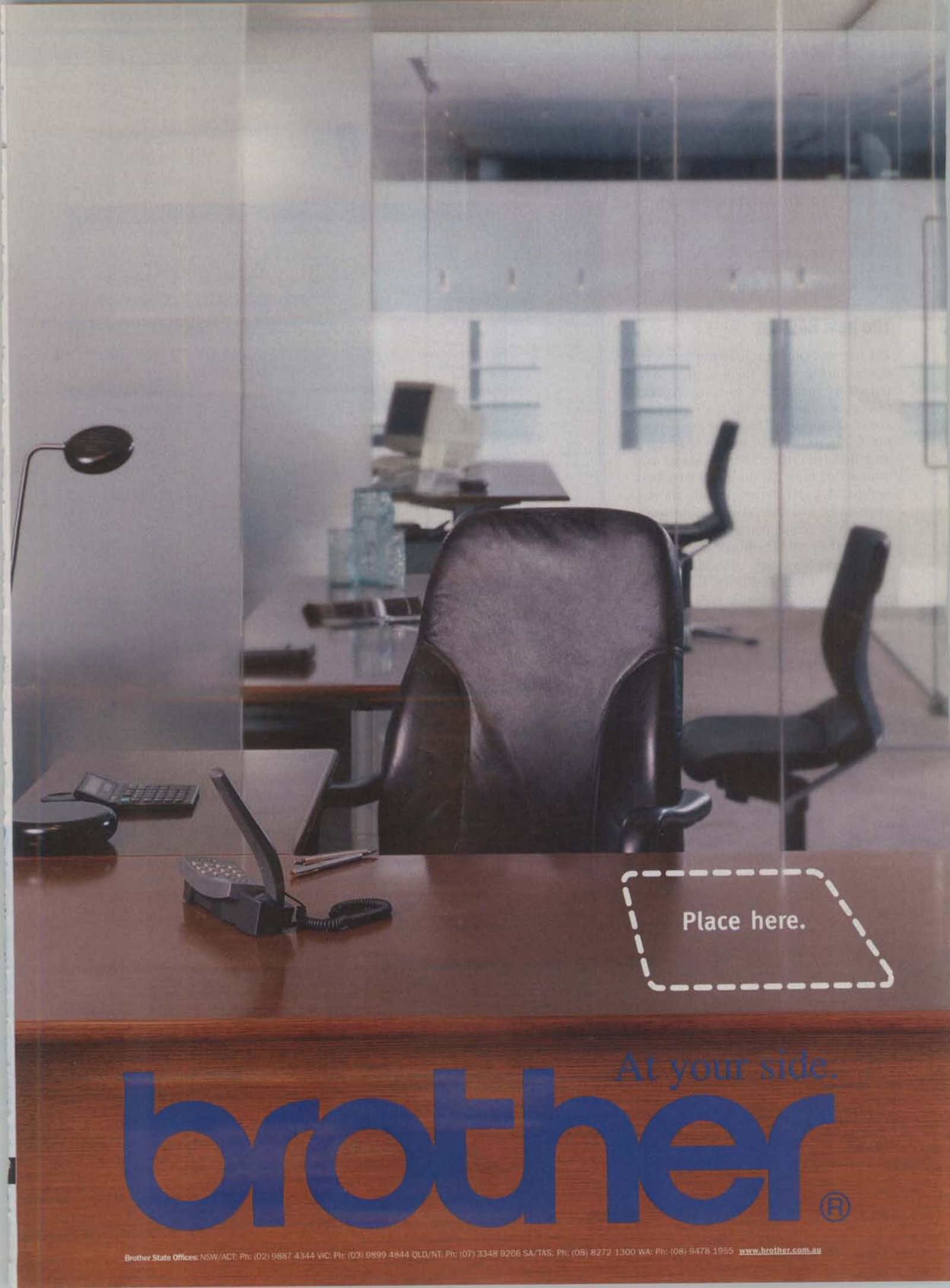


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Red Hat 7.1 vs Mandrake 8.0

Red Hat 7.1 and Mandrake 8.0 have hit the streets, so *APC* has put them head-to-head. We've also put Red Hat 7.1 on our cover CDs. The two distributions improve on their previous versions, eliminating bugs and providing new features.

The new Red Hat

The release of Red Hat 7.0 was marred by the inclusion of an incompatible and reportedly incomplete version of glibc, the core C libraries at the heart of every Linux distribution. The new version of the C libraries broke many programs, and Red Hat attracted a reasonable amount of flack in forums and newsgroups. A patch was released shortly afterwards, but the lesson many have learnt is to avoid point-0 releases and wait for the next official revision.

That revision is now available, and as you would expect, Red Hat 7.1 is a more refined version of its predecessor. It has plenty of bug fixes and security updates, as well as quite a few new features and some long-awaited upgrades.

Two notable additions to the installation program are a new ability to configure and install a firewall, and a new installation class for laptops. If the installation routine detects laptop (PCMCIA) hardware, this class is automatically selected.

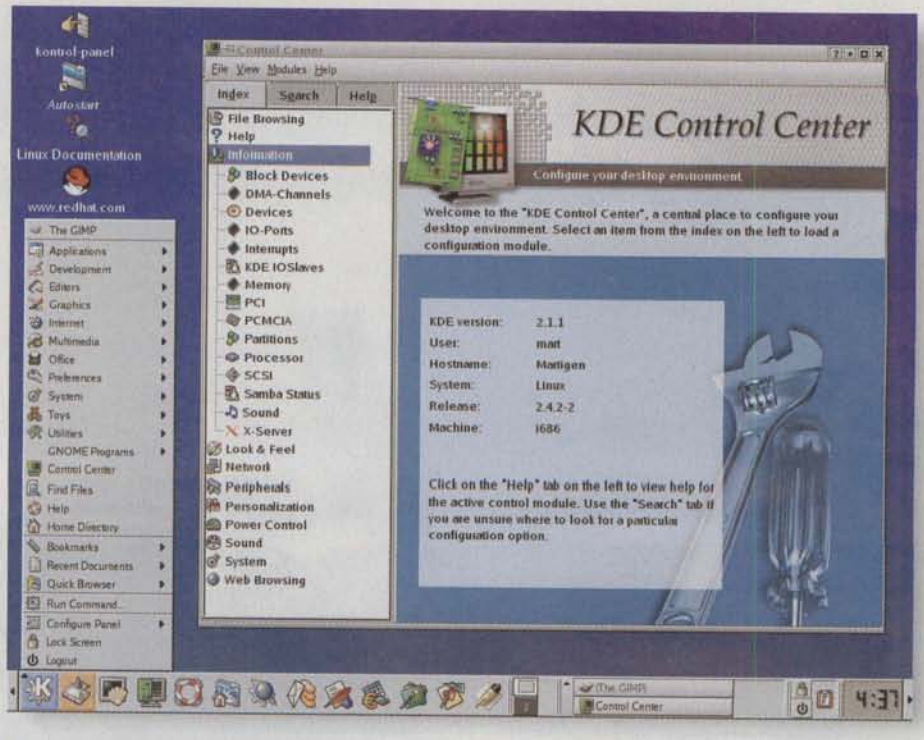
Perhaps the most important update in 7.1 is the inclusion of the 2.4.2 kernel. Red Hat isn't the first to use a 2.4-based distribution — SuSE had it earlier — but Red Hat 7.1 is the first 2.4-based Red Hat distribution.

The famed 2.4 kernel is a significant improvement on the 2.2 series of kernels. It provides increased performance, many more drivers for all sorts of hardware (including Ultra DMA 66/100 controllers), and features such as mature USB and SMP support.

Another significant development in 7.1 is the inclusion of XFree86 4.0.3, which also has larger driver support including full 3D capabilities for most popular 3D cards.

Red Hat highlights

- Kernel 2.4.2
- XFree86 4.0.3
- KDE 2.1.1
- Gnome 1.2
- Red Hat Network



▲ The Red Hat 7.1 desktop using KDE 2.1.1

This release also includes KDE 2.1.1. KDE experienced renewed interest with the release of version 2.0 late last year, and it's good to see Red Hat finally integrating an up-to-date KDE into Red Hat. In contrast, Gnome has been neglected in this release. Only version 1.2, which is a couple of steps behind the latest 1.4 release, has been included. This is disappointing, as Gnome 1.4 has some significant advantages over the earlier version. For example, it has Eazel Inc's Nautilus desktop, which can make any Mac user feel at home.

Mandrake 8.0 includes Gnome 1.4, so it's strange that Red Hat decided to leave it out. Similarly, the new faster and more efficient ReiserFS journaling file system doesn't seem to be available, even though it's been standard since the 2.4.1 kernel. Mandrake has included ReiserFS as an option since version 7.0.

Interestingly, Red Hat has started to integrate the best features of its own programs with those of the desktop environments. For example, Red Hat provides a new program to configure ADSL connections, but starts KDE's KPPP program to configure PPP (dialup) connections.

Red Hat has also spent some time refining its own applications, such as the update agent and registration system for the Red Hat Network. These are great for keeping your system up to date with the latest security and bug-fix releases. Red Hat Network is very well designed; it's well worth signing up for if you're a Red Hat user.

Red Hat treads a fine line between stability and cutting-edge features. Distributions such as Debian pride themselves on stability, but achieve this by only including packages that are guaranteed to be stable. Debian is therefore often behind the times; for example, it has yet to release a distribution based on the 2.4 kernel. Conversely, Mandrake is often the first to include the latest features and technology, but this sometimes comes at the cost of stability. Red Hat sits neatly between the two, offering a stable distribution that also keeps pace with developments.

Red Hat 7.1

Pros More refined and complete than 7.0
Cons A little behind the times in some areas

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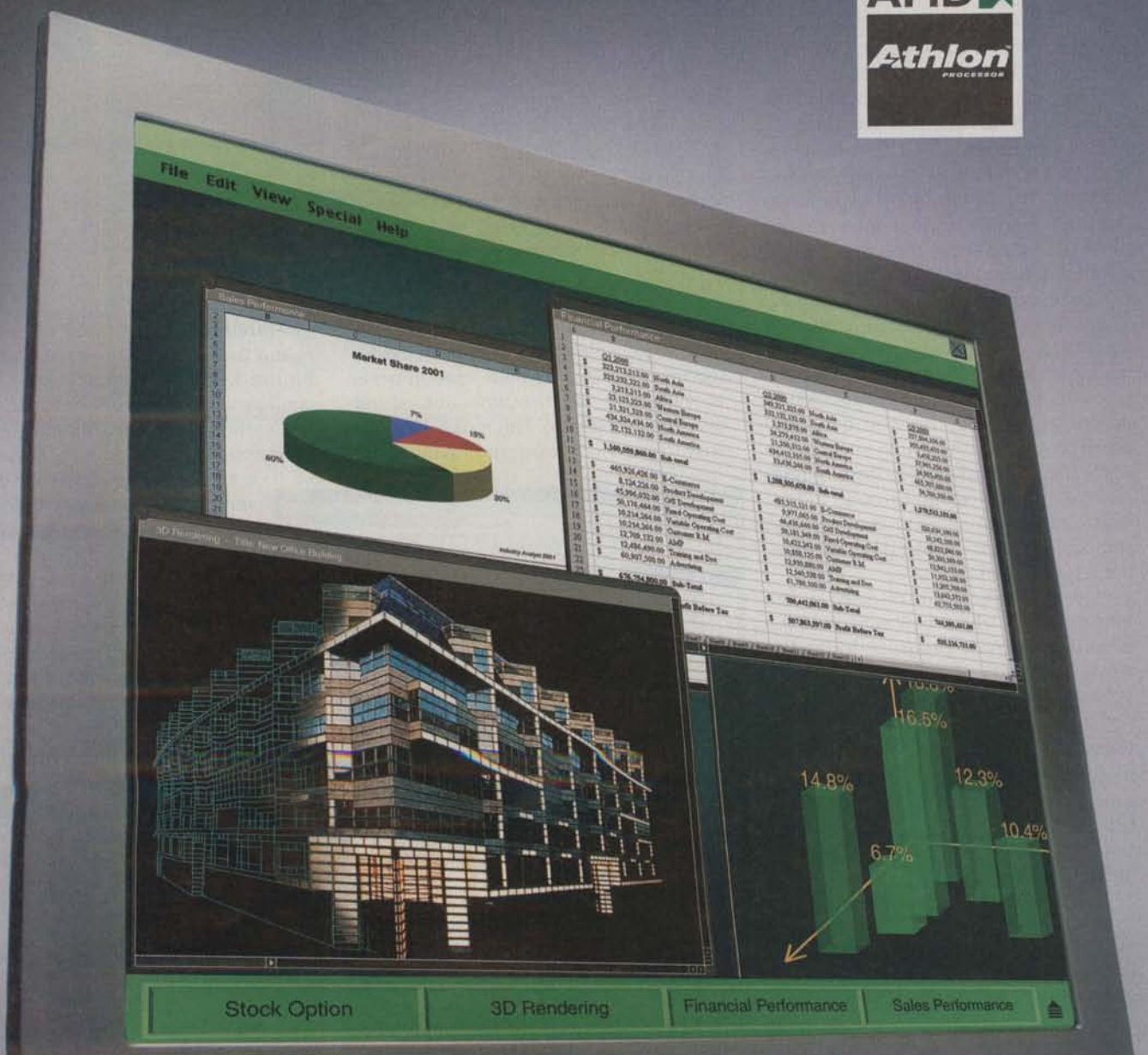
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The magic of Mandrake

Originally based on Red Hat, Mandrake Linux has developed independently to become a distribution in its own right. Red Hat is now more of a corporate distribution aimed at server and desktop solutions in professional environments. Conversely, Mandrake is designed for home users, and provides a high-powered and easy-to-use operating system for new and experienced users alike.

Mandrake is built for speed by taking advantage of Pentium CPUs, and as a result, it doesn't run on anything less. Like Windows 95/98/Me, Red Hat is what's known as an i386 distribution — it runs on 386, 486 and 586 (Pentium) or faster machines. Red Hat provides i586 and i686 optimised kernels in addition to the standard i386 kernel, but all other packages in the distribution are built as i386 binaries. In Mandrake, all packages — from essential server daemons to simple text editors — are compiled for and optimised as an i586 binary.

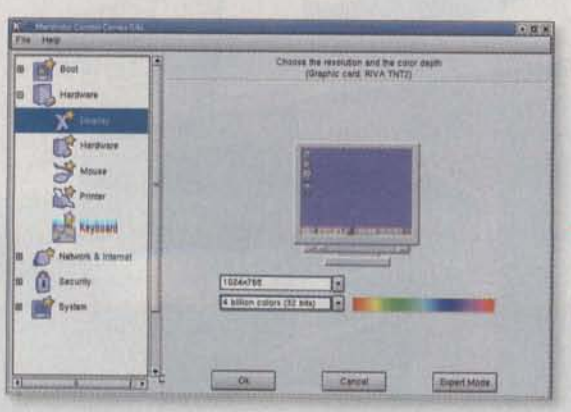
The numerical jump from version 7.2 to 8.0 signifies a substantial change. A whole new suite of tools has been added in an attempt to make Mandrake the perfect desktop operating system. A new program along the lines of a control panel centralises everything you need to configure Mandrake, from display resolutions and networking through to firewall and system security settings. Red Hat has a similar control panel feature, but it isn't as impressive.

A new graphical LILO is used as the boot manager, and a new version of the graphical Aurora program hides the usual geekspeak of a Linux bootup to provide perhaps the sexiest bootup of any operating system currently available. The humble Rpmdrake tool has undergone a complete rewrite and now provides an easy way to search for and install security updates, cutting-edge 'cooker' releases, and packages from the distribution CDs.

Like Red Hat, Mandrake 8 incorporates XFree86 4.0.3, but uses a tailored 2.4.3 kernel. This is the first Mandrake distribution to be based on the 2.4 kernel. KDE 2.1.1 is also included, but unlike Red Hat, Mandrake takes advantage of the latest version of Gnome, which has Nautilus's easy-to-use interface. Both of these environments provide stable, complete, standardised and feature-rich desktops. This makes Linux as easy to use, if not easier, than Windows.



▲ The Mandrake 8.0 desktop showing Gnome 1.4 and Nautilus



▲ The new Mandrake control panel centralises everything you need to configure your Linux system.

However, the news isn't all good for Mandrake 8.0. Despite the new features, the distribution isn't as polished as Red Hat 7.1. There are several bugs; for example, setting a new style for the Aurora bootup program causes (harmless) error messages, and enabling anti-aliased fonts in KDE requires you to select more legible fonts manually — something which wasn't necessary with KDE in Red Hat. Similarly, Mandrake doesn't detect or operate media such as Zip or Jaz drives in KDE properly (but these can be handled manually) — again, something Red Hat has no problem with.

Mandrake is renowned for incorporating the latest and greatest, and combining KDE and Gnome with Linux's configuration tools makes Mandrake 8.0 the easiest-to-use distribution *APC* has reviewed so far. However, more time could have been spent ironing out small issues, and as with Red Hat 7.0, it might be better to wait for a point-1 release.

For the past few years, *APC* has tracked the development of Linux. Our *Linux Pocketbook* series was produced as a guide to getting started and making the most of Linux. Through it all, we've seen Linux mature from an operating system that required an intimate understanding of Unix to one that, perhaps for the first time, is complete enough to tempt everyday Windows users.

Ashton Mills

Mandrake highlights

- Kernel 2.4.3
- XFree86 4.0.3
- KDE 2.1.1
- Gnome 1.4
- Pentium optimised

Mandrake 8.0

Pros Cutting-edge Linux
Easy to use

Cons Rough around the edges; it might be wise to wait for version 8.1

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Intel Pentium 4 1.7GHz

If you look at *APC*'s past reviews of Intel Pentium 4 processors, you'll notice a common thread: they didn't rate well. They are expensive, run very hot and lack the performance of an AMD Athlon or even a Pentium III at a much lower clock speed.

Intel representatives have repeatedly advised *APC* to wait until Pentium 4-optimised software is developed before judging the new processor. However, even Intel has withdrawn claims that the Pentium 4's performance is generally superior, and the Pentium 4 is now all about 'performance where you need it most'. According to Intel, you need it most when you're ripping MP3s, encoding MPEG-4 movies, surfing cutting-edge Web sites and notching up the frags in games. Anything else won't perform as well.

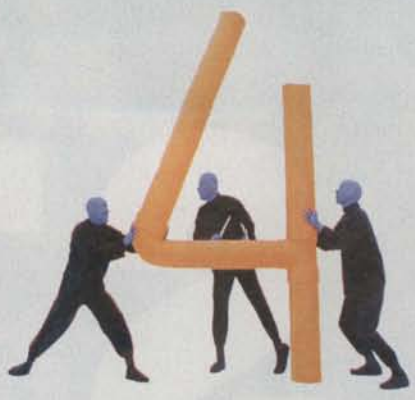
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1.7GHz	54.7
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1.5GHz	18,400
1.7GHz	20,300

Optimised software is still reasonably thin on the ground, but there are some changes on the horizon that will make the Pentium 4 a far better prospect than it was when it was launched in November 2000. A version of the Pentium 4 is coming out later this year that will feature a new socket design and chipsets that allow for DDR SDRAM support. With the 1.7GHz Pentium 4 available now and 2GHz chips on their way later in the year, the Pentium 4 is ready to outstrip the rest with its high clock speed and the brute force of its processing power.

So why would you buy now? Easy — Intel has launched the 1.7GHz processor with a starting price for original equipment manufacturers (OEMs) of $US352 each for volume sales. This is well under the $US1,000+ that new processors usually command. At the time of writing, the 1.7GHz powerplant had not arrived in Australia, but you can expect to see dramatic price drops soon. The US price quoted is a wholesale figure, and will be affected by Australian taxation.

Performance anxiety

APC's test machine was a 1.7GHz reference system supplied by Intel and not available to the public. The processor was an engineering sample without the chip packaging or labelling that will be commercially available. On the whole, the system was a good indication of where the Pentium 4 is likely to go. The machine was fitted with an



nVidia GeForce2 Ultra card with 64M DDR RAM, 256M RDRAM and a 30G hard drive on an Intel D850GB motherboard.

For performance comparison, *APC* also dropped a 1.5GHz Pentium 4 processor into the same system. The new processor is only 13% faster than the 1.5GHz chip and the benchmarks *APC* ran reflected this slight performance increase with scores showing what the extra 200MHz is capable of. However, this is still not up to standards set by the AMD Athlon and Intel Pentium III processors when *APC* tested the Dell Dimension XPS-B1000r 1GHz Pentium III and the Gateway Select 1100 AMD Athlon 1.1GHz system (see *APC* January, page 30).

For business and general applications, the Pentium 4 still lacks the requisite grunt. It consumes a lot more power than other processors and is hot to run. This is why sales have been down. However, for home needs it has more than enough power to allow you to make movies, use multimedia applications and play games.

Darren Ellis

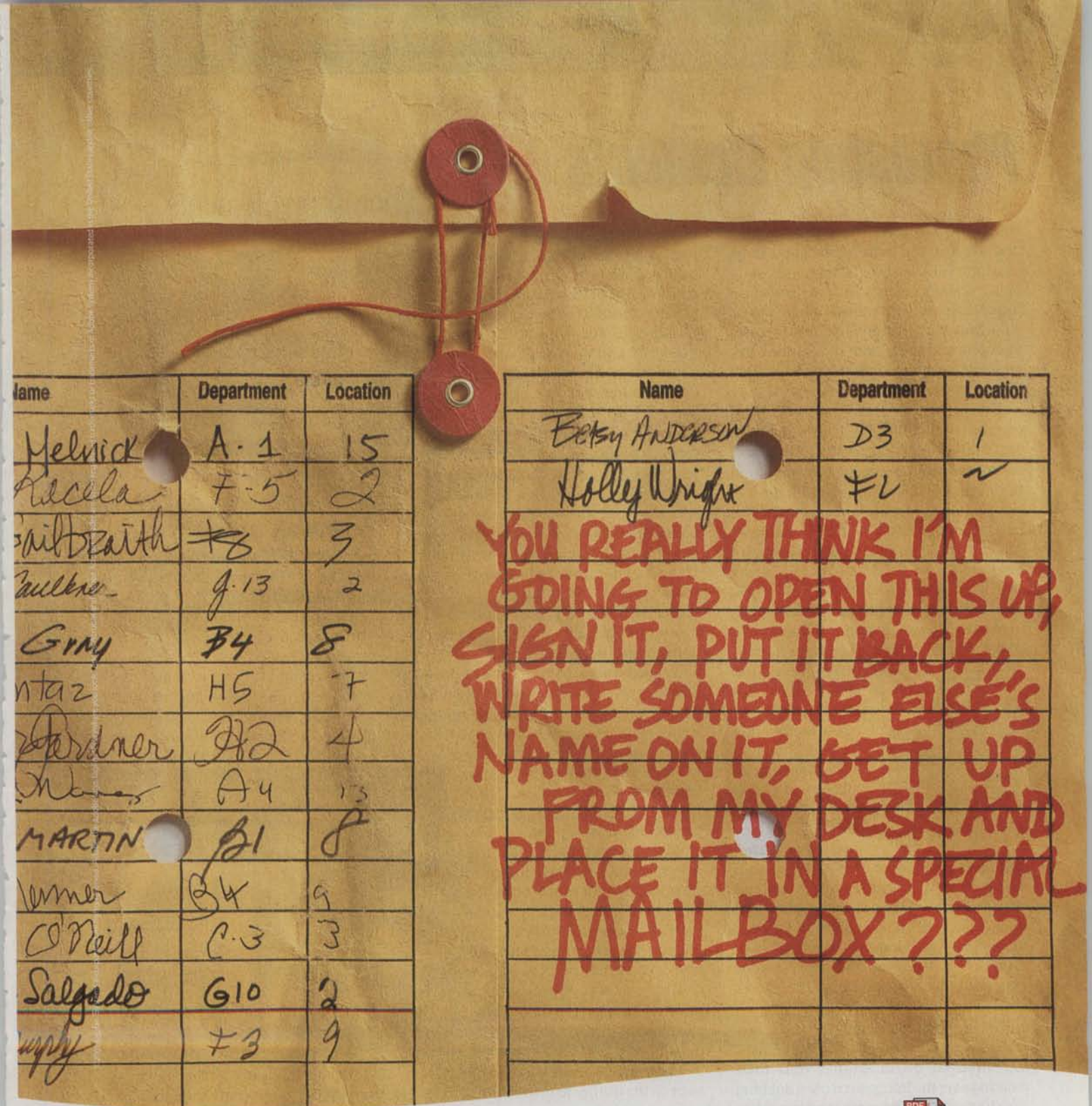
Contact Intel
Phone 1300 363 018
Online www.intel.com.au
Price Local prices TBA

What's a bag of chips worth?

The Pentium 4 (P4) is no longer the pariah it once was, but don't buy just yet, because the best is yet to come. The 1.7GHz P4 is so new in Australia that prices weren't available on any Australian reseller's Web sites at the time of writing. At present, prices for a 1.5GHz chip vary from $1,400 to $1,500, and up to $1,800 with 128M of RDRAM. This is still prohibitively expensive, but using the US OEM price at the 1.7GHz launch in the US as a guide, a system with the new chip will be cheaper than a machine with a slower processor.

So what price cuts are on the way? Currently, volume sales prices are $US637 for the 1.5GHz, $US423 for the 1.4GHz and $US332 for the 1.3GHz. Unofficial cuts of 60% for the 1.5GHz, 54% for the 1.4GHz and 42% for the 1.3GHz are expected to start in the final week of April, as *APC* goes to press. This would reduce volume OEM prices to $US256, $US193 and $US193 respectively, and could make the P4 a leader in Intel's line-up over the coming months.

In addition to these enormous price cuts, Intel is still running a rebate program. Manufacturers can get up to $US60 for each PC fitted with RAMBUS. There won't be any drastic price cuts for RAMBUS chips in the near future, so for now, PC manufacturers are stuck with the expensive, unstable RAM. Later this year, new motherboard chipsets from Intel, VIA and others will be available that allow the Pentium 4 to run with cheaper DDR SDRAM. At about the same time, the new P4 processor with smaller transistors, more pins, lower voltage requirements and new chip packaging will also hit the market.



Of course not.

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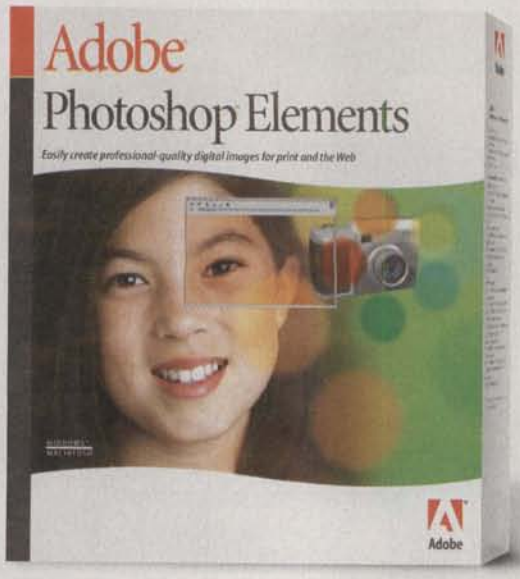


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Photoshop Elements



Photoshop Elements is more affordable and easier to use than Adobe Photoshop, and provides amateurs with access to many of the professional package's features. The product is aimed at home users who want to retouch scanned photographs and shots from digital cameras, and anyone who wishes to put images on their Web site.

One of the new tools — unique to this program — is the red-eye reduction brush. This allows you to adjust the tolerance of colour and paint inside the eyeball — and the brush does the rest. Well, that's the theory. Getting the brush tolerance right can be a bit fiddly, and if you're not careful you can end up giving your subject a couple of black eyes.

The photo merge mode is useful if you want to piece together a series of shots taken from left to right to make one big photo of a panoramic landscape. This works surprisingly well, and even allows for changes in perspective from shot to shot.



▲ Red-eye reduction

A file browser allows you to view small thumbnails of all images on your computer. This saves travelling to the File Open menu and then searching for images. Special effects are also easier to incorporate into images using the filters palette, which is a simple tool for choosing embossing, shadows and Web button designs for your images by double-clicking an the effect's icon.

The Impressionist paintbrush is less useful. You can play with your photos by choosing different brush shapes and then painting over the image to create a dabbing or swirling effect. The result is rather messy on some settings, but with tweaking, interesting results can be achieved. However, similar effects can be achieved with the other artistic filters included in the package.

Other useful features include the hints and recipes palettes. If you want to know how to add a drop shadow, for example, you look it up and the palette explains how to do it. In some cases, it will even do it for you if you click the arrow next to the explanation. If you don't know what a tool does, hold your pointer over it and it will tell you how to use it, which saves reading the 100-odd page manual. There are also some borders and basic shapes such as speech bubbles and heart shapes to add to your images, and more shapes can be downloaded from the Web.

When printing to your desktop printer, Elements' Picture package feature allows you to save paper by printing multiple copies of an image on to one page. This is great, especially if you're using expensive photo-quality paper. Enter the size of each picture and the program arranges the pictures to fit on your page.

Most of Photoshop's features are available in this program; surprisingly, not much has been left out. Photoshop's 'save for Web' function is included, allowing you to view compression settings in a variety of formats. You can also do text editing, which allows arcing of text, embossing, shadows, outer glows and putting pictures inside type.

Photoshop's more complex features, such as the ability to draw a path around an object to accurately remove it from its background, have been left out. Instead, you have to rely on the rather limited background eraser tool. The channels palette, which allows you to select and save areas of an image to be filled with patterns or colour, is also absent.

As Elements has most of the features of Photoshop, you might ask why people don't use it as a professional tool and save themselves a lot of money. The main catch is that there are only four colour modes: RGB, grayscale, Index colour and bitmap. CMYK is not available, so printing full-colour images to a professional printer is not an option, although it certainly does the job for basic Web design graphics.

Photoshop Elements is almost as good as the real thing, depending on what you need it for. It only costs $299, which is a fraction of Photoshop's standard price of $1,450. At this price it is definitely worth considering. It may not qualify as a professional tool, but its added features certainly make it a worthwhile purchase for amateur use.

Craig Carroll



▲ The Hints palette shows you what a selected tool does.



▲ The Recipes palette shows you how to perform chosen tasks.



▲ Create Web buttons with the Layer Styles palettes

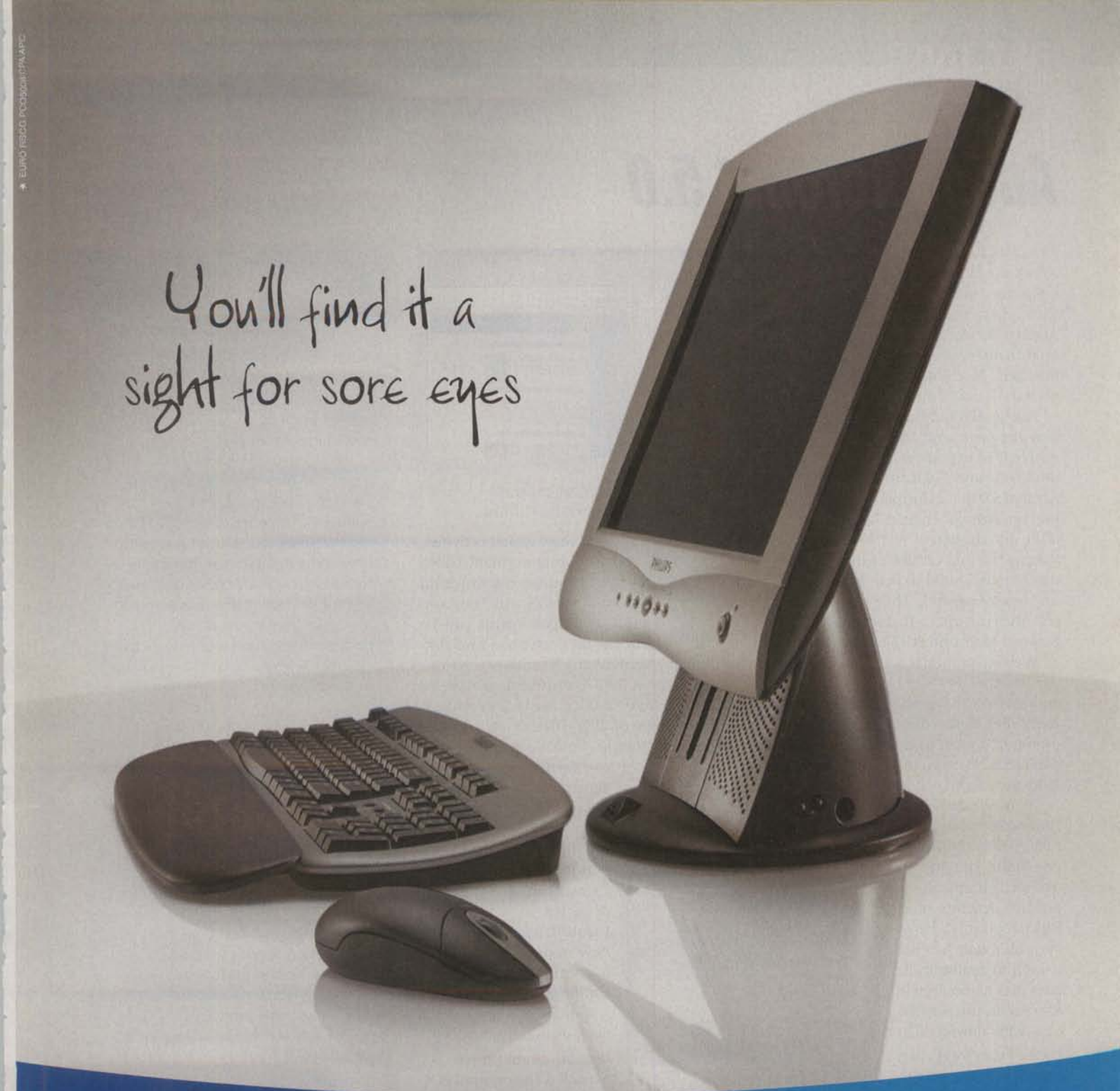


▲ The easy-to-use Effects palette

Pros Very affordable
Rich set of easy-to-use features

Cons Some features are frills rather than useful tools

Contact Adobe
Phone 1300 550 305
Online www.adobe.com.au
Price $299



Not only is the Philips DesignLine 150X the best looking LCD monitor around, it's easy on the eye in many other ways too. No radiation, flicker or reflection reduces the damaging effects regular monitors have on frequent users. And its wide 160° viewing angle makes it easier to share the view with others. Plus, the 150X has a DVI interface connector for dual DVI and VGA connectivity, ensuring the user has the sharpest image possible.

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Adobe Acrobat 5.0

Most Net surfers are familiar with Adobe Acrobat's PDF format. PDF documents retain the exact formatting of the original when viewed on a computer with the free Acrobat Reader software, regardless of the operating system or which fonts are installed. To create these documents you need the Acrobat authoring software.

Adobe Acrobat has seen some changes over the years and has developed from a simple DTP export program to a powerful and Web-savvy document sharing tool. Acrobat 5.0 makes further improvements to the core Acrobat engine. A prime example is the introduction of Web-based document sharing, so that groups of users can comment on and build shared documents over any type of network. The system is not perfect (for instance, it doesn't work well between Macs and PCs), but it's still useful.

Web integration is a key part of Acrobat 5.0 in other ways. Single Web pages or entire sites can be downloaded and automatically converted into PDF files. You can even use Acrobat as a Web browser, if you don't mind losing a lot of plug-in compatibility (JavaScript actions are preserved).

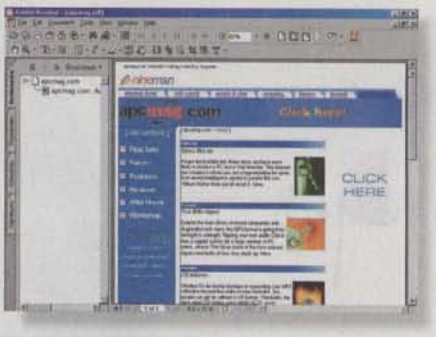
Acrobat handled most of the pages *APC* threw at it and retained a good level of accuracy. Where a function or plug-in couldn't be accessed, it still managed to generate most links readably. However, although Acrobat is keen to maintain its own files as accurately as possible, this isn't the case with downloaded pages. Fonts were often changed to the default Acrobat settings.



▲ Preparing to HotSync PDF files to a handheld

The Acrobat interface now looks even more like a Microsoft Office application, but most onscreen toolbars can be modified if they aren't to your taste. If you're running Office, Acrobat can install itself as a toolbar within Office applications so that, with a click of the mouse, you can export the current document to PDF. You can then email the resulting document to specified people.

Bookmarks can be set up to differentiate between headings and content — colour or style changes are used to mark different types. Movement between document formats has also been enhanced. Images can be exported as individual files in a variety of graphics formats, and text can be saved in RTF format. To assist these export activities, Acrobat 5.0 uses an enhancement called tagged PDF, which identifies the structural elements in documents. Security has been tightened up as well; documents can be secured using 128-bit encryption and electronically signed using a range of services.



▲ Web pages can be downloaded and automatically converted to PDF files.

The new PDF Consultant tool helps manage Acrobat documents. It provides a breakdown of PDF files based on the amount of images, bookmarks, hyperlinks and content. It can then be configured to optimise space depending on user preferences by removing potentially redundant elements such as image alternates and incompatible JavaScript actions. *APC* tested PDF Consultant by running a series of documents through it. Finding out how many images are in a document isn't all that thrilling, but the optimisation features work very well, especially on downloaded Web pages. As expected, the original PDF didn't shrink at all. However, an individual Web page from **apcmag.com** shrank by just under 11%. A small Web site rendered as a PDF was compressed by just over 13%.

Pros Improved functions for multiple users
Enhanced document export options

Cons Some problems with Web rendering
Costly

Contact Adobe
Phone 1300 550 305
Online www.adobe.com.au
Price $599 ($228 for the upgrade)

Hands on

To extend Acrobat's reach, Adobe has introduced an Acrobat reader for the handheld Palm OS. Developers such as DataViz and Aportis have previously offered similar document conversion utilities, but Adobe's product has the advantage of being free.

The Palm-based Adobe reader uses a basic desktop interface on a PC to select files for exporting to the handheld. These are transferred during the HotSync process. In a handheld environment, it's almost impossible to reproduce original Acrobat documents, so the Palm PDF reader uses Acrobat 5's tagging system to identify document structures and provide basic onscreen formatting by changing font sizes and weights. Most existing PDF files don't include the tags, but the software is reasonably good at identifying major elements, such as headings, in documents.

When preparing files for export to a Palm device, you can also elect to eliminate images to reduce size (a good idea, as many images in Acrobat documents are included for formatting purposes and don't render well in the limited screen width provided by a handheld). Even with these compression options selected, it doesn't take long to fill a Palm with larger PDF files, so regular file maintenance is essential.

The Palm OS reader weighs in at around 190K. Its straightforward and quite uncomplicated Viewing options include changing the entire document to a single style and viewing it in full screen (but this makes relatively little difference). A series of Graffiti shortcuts for viewing and file management are built in, and Acrobat's commenting and table of contents are supported.

Acrobat can be installed over a network to multiple machines and can be used across a network in conjunction with database formats. This means that, using XML as a common format, complex forms can be created within Acrobat and then served over the Web for data collation and comparison.

Angus Kidman

Full colour, superior economy. $119.[RRP]

BRILLIANT PHOTO COLOUR on plain paper, super operating economy, high speed blacks, PhotoRealism and automatic image improvement. You can't go wrong with the super value BJC-1000SP.



PhotoRealism produces colours between colours.

PhotoRealism.™ When superior photographic reproduction counts.
The optional PhotoRealism cartridge is ideal for high resolution paper, glossy photo paper and high gloss film. Low-density inks vary colour saturation per dot to dramatically increase the colour combinations, reduce graininess and smooth tonal gradations.

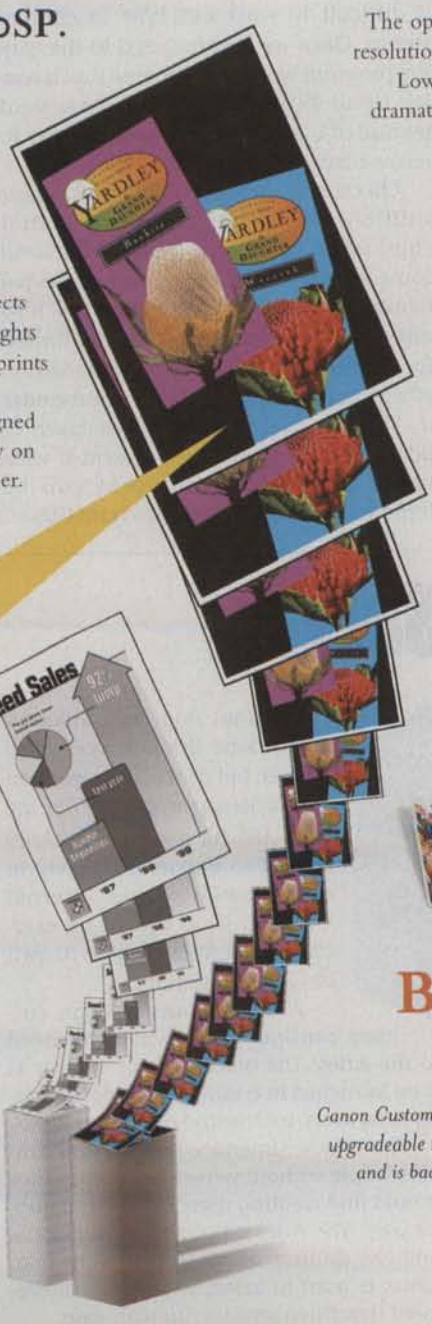
Brilliant plain paper photo quality automatically.
The BJC™-1000SP uses advanced colour definition routines for half-tones and areas of low colour density. A separate, selectable function called Photo Optimiser is included in the printer control software. It automatically adjusts for defects in exposure, highlights and shadows, and prints accordingly with standard inks designed to optimise quality on low-cost plain paper.



Before. *After.*



Better Internet images. Image Optimiser, a printer control software feature, can automatically "correct" low-resolution images up to the printer's maximum resolution.



Print banners up to 6 A4 pages long, envelopes, overhead transparencies, T-shirt transfers, and even choose an optional fluorescent ink cartridge for display effects.



Reduced operating costs.
Using a special resolution matrix, the BJC-1000SP features a Super Economy mode that vastly improves operating economy without the definition sacrifices common to so many draft modes. It effectively quadruples output from both the black and colour cartridges.[1]

High quality blacks at high speed.
The optional high capacity black ink cartridge uses 64 print nozzles for high print speeds. The selectable text smoothing mode goes up to 720 dpi to maximise text quality.



Optional BC-03 high capacity black ink cartridge.

BJC-1000SP
Just $119[RRP]

3-YEAR WARRANTY OPTION

Canon Customer Care. The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

Canon

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Canon Australia Pty Ltd ACN 005 002 951. ABN 66 005 002 951.

Ulead VideoStudio 5

Whether you're aiming to be a bargain-basement Kubrick or shooting for fame at Tropfest, Ulead VideoStudio 5 may be your ticket. It satisfies basic video editing needs: digitising footage, cutting it together, adding titles and transitions, and exporting the results to tape, CD or one of several Internet formats.

The interface has been refined slightly from the previous edition. When you launch it, you're obliged to click a green Start link at the top. This starts an online tutorial that takes you through capturing video, arranging clips, adding transitions, titles and music, and then exporting the finished product. Capturing can be done either manually or automatically. The first allows you to decide where each discrete scene starts and finishes, and the second checks where scenes break. This process can be made very precise by the use of a timecode if the footage originated from a DV camcorder.

There are two ways of viewing edited clips: a timeline mode, which looks a lot like the timeline displays for many other editing programs; and a clip mode, which shows a single frame from each clip bracketed by whichever transitions you've selected. You can toggle between these two modes with a switch next to the timeline display.



This fact escaped *APC* at first, making it difficult to work out how to change things. Once we became used to the way the program worked, it became much easier. Up to 99 levels of undo (a consistent feature of Ulead products) make it easy to recover from mistakes.

Effects such as blurs, gels and colour shifting can be applied to individual clips, while transitions (fades, wipes and some snazzy 3D effects) can be wedged between segments. VideoStudio 5 is also one of the first programs to be optimised for the Pentium 4 chip, with 25 transition effects tailored to specific P4 commands.

You can layer video (only one layer) or add text titles, which also present a wide range of effects. Soundtracks can be imported from MP3s or ripped from CDs.

Any changes you make to sound or video force a rerendering of the changed material. There's no easy way to minimise the program while it's rendering, but you can use Alt-Tab to switch away to another application.

Once you're finished, the results can be exported in a dizzying range of formats: Microsoft's AVI, QuickTime, Real, DVD-format MPEG files, and VHS tape. *APC* was able to piece together a 10-minute production using all of the above features and export it back to tape within an hour.

Programs for beginners are often only as good as their documentation. VideoStudio 5's printed manual is light, but lavishly illustrated and extremely easy to follow.

Serdar Yegulalp

Pros Supports wide range of output formats
Pentium 4 optimisation

Cons Toggling between timeline and clip modes takes some skill

Contact Pineapplehead Distribution
Phone 1800 657 601
Online www.ulead.com
Price $262

Celestix Aries Server

Standalone servers for the small or medium-sized business market are becoming more common, but the Aries is unlike any server *APC* has seen before.



It is no larger than the average PC subwoofer, making it ideally suited to perching on a desk or a bookshelf.

Celestix boasts that no computer expertise is required to configure the Aries, a promise that needs to be taken with a grain of salt, especially if you've had no experience with setting IP addresses or using DHCP. Once you're past that, the rest of the configuration process is easy.

Initial setup is performed using the LCD panel on the front of the box, and the highly modified Red Hat Linux kernel is all but invisible during normal use.

The Aries is set to run as a DHCP server by default, so if you install it on a network that already runs one, it's a good idea to disable the default.

The final stage of configuration is done through your Web browser, but a lot of it is repetition of functions performed from the LCD. *APC* hit a snag here; Aries refused to update accurately in any browser except Internet Explorer. Care should be exercised when Aries suggests its own stock configuration.

A wizard runs through custom configuration, which is saved to the Aries. The administrator console is then launched in a different mode for configuring users, folders and network settings.

The browser interface is clean and simple. People without networking experience should find creating users and setting quotas easy. The Aries supports print, mail, file and Net sharing, all set up with little fuss. Linux is hard to tame, so it's an achievement that these services run with ease.

The model *APC* tested came with a 6G notebook hard drive, but Celestix intends to offer a 10G model locally — plenty for a typical small business. The drives are not upgradable. There is a 200MHz Cyrix MediaGXm processor with 64M of memory.

Aries can connect through Ethernet, PC Card support for 802.11b wireless networking, serial modem and parallel port. There's no support for the infra-red port on the server's front panel, but this feature will probably become available later.

Alex Kidman

Pros Small and inexpensive
Easy to set up

Cons No hardware upgrades
Some updates tricky to manage

Contact TBA
Phone TBA
Online www.celestix.com
Price Approx. $1,999

Big printer performance.

Small printer price & economy. $159.[RRP]

HIGH RESOLUTION COLOUR, high-speed blacks and superior operating economy with easy to use, broad flexibility for Windows and Mac. Plus optional PhotoRealism and scanner cartridge.



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Reduced operating costs.
Super Economy mode uses a special resolution matrix to improve operating economy without the definition sacrifices common to so many draft modes. It effectively quadruples output from both the black and colour cartridges.[1]



Better Internet images, special effects.
Image Optimiser can automatically "correct" low-resolution Internet images up to the printer's maximum resolution. Turn photos into simulated illustrations and create sepia and mono hues, print banners up to 6 A4 pages long, envelopes, overheads and even T-shirt transfers.





Duplexing, high speed blacks. A new driver allows manual duplex on plain paper with standard inks. For B&W only, an optional dedicated black ink cartridge with 128 print nozzles offers print speeds up to 5 pages per minute.[2]



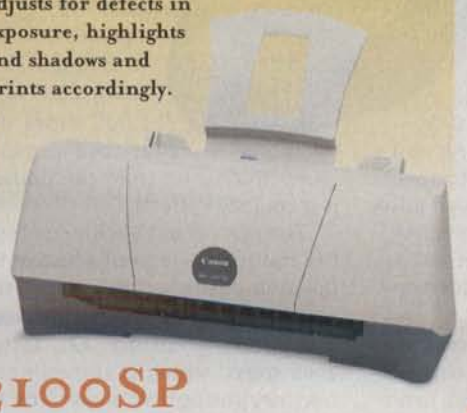
Built-in parallel and USB interfaces for Windows and Mac.[3]



The optional scanner cartridge captures colour photos and text with resolutions up to 360 dpi.

Automatic Image Improvement, easily.
Advanced colour routines help define half-tones and areas of low colour density. Photo Optimiser automatically adjusts for defects in exposure, highlights and shadows and prints accordingly.







Drop Modulation Technology.
Smaller ink drops, about ⅛ the size, are automatically mixed with standard drops to enhance quality.



Layering variable ink densities in each pixel lets you print colours between colours.

5 times the photographic colour combinations.
Optional PhotoRealism™ inks vary the saturation so that a single dot could have 0%, 33%, 67% or 100% of a colour. This produces up to five times as many colour combinations as conventional CMYK inks for better half-tones and less grain.

3-YEAR WARRANTY OPTION

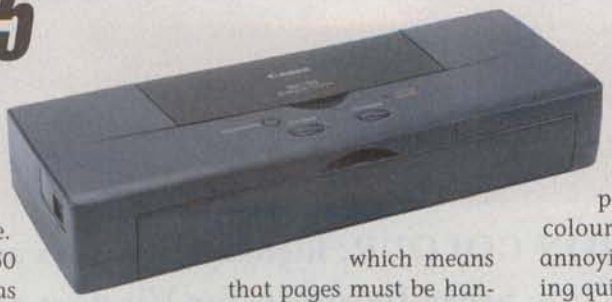
Canon Customer Care.
The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call *1800 021 167.*

BJC™-2100SP
Just $159[RRP]

Canon

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Canon BJC-55



Mobile connoisseurs can take their pick from a seemingly endless procession of notebook PCs and a score of portable projectors, but a printer that you can take on the road is far from commonplace.

This update to Canon's popular BJC-50 model is the first portable printer *APC* has seen that lacks the conventional parallel port. The BJC-55 relies solely on USB and infra-red, which at least makes it compatible with most of the latest Macs (both notebooks and desktops), as well as Windows boxes. If you have a Windows CE or Pocket PC device, you can get hard copy from your handheld over the IR beam.

As is the case with most printers, no connecting cable is supplied. This is a constant source of frustration.

The size of the BJC-55's print cartridges means that individual colours cannot be replaced. It will take individual black, colour and photo ink cartridges, so there's still a reasonable amount of flexibility.

With portable printers, there's always a trade-off between the size and the function of the printer. With a printer this small, there's no supplied paper feed tray, which means that pages must be handled individually. A 30-page feeder is available separately, but *APC* was unable to review one. Page-by-page printing is annoying for any document larger than about four pages.

As with many printers in Canon's range, you can purchase a scanner head for the BJC-55. Snap it in where the print head usually goes and you can use the printer as a scanner.

For such a small printer, it requires quite a bit of desk space, as the absence of a tray means that pages must be laid flat for printing. Pages feed automatically into the printer, but during the tests, the printing application then had to be told that paper was, indeed, in the printer.

As could be expected, the print speeds on the BJC-55 weren't spectacular, but to its credit, it was relatively quiet while printing. *APC* did encounter problems with getting the printer to acknowledge that the photo printer cartridge (and not the colour) was inserted, which could be annoying if you need high-quality printing quickly.

The BJC-55 doesn't offer a great deal extra for owners of the BJC-50 and 85 models, apart from the photo printing and Windows CE options. For anyone else, the BJC-55 is an excellent portable colour printer.

Alex Kidman

Pros Light and compact
Does photo quality printing
Cons Changing cartridges can be difficult
No supplied cable

Contact Canon
Phone (02) 9805 2000
Online www.canon.com.au
Price $649

Logitech Cordless MouseMan Optical



The mouse has come a long way since Doug Engelbart, the father of the GUI, carved his prototype pointing device from a block of wood and fitted it with two sets of wheels and a plastic switch. Trends towards ergonomic design, Web-friendly wheels, cordless pickups and optical sensors have substantially improved the device.

Logitech has produced several successful cordless mice and keyboards that use low-power radio beams to connect with a small transceiver unit plugged into the PS/2 ports of your desktop or notebook.

Its Cordless MouseMan Optical is cordless *and* optical, making it far superior to other devices available at present. The cordless operation sets you free from tangled cables, and the optical sensors provide greater precision and smoother tracking than conventional ball-based rodents.

The mouse's range depends mainly on the position of the PC-connected sender unit. *APC* tested it by placing it on top of a tower system under the desk. From this position, the effective range was barely 1m. However, with the transceiver on the desktop, pointing and clicking was possible 5m from the PC. Line of sight to the sender isn't required.

Turning the mouse belly-up reveals an optical sensor accurate to 800dpi. This takes a 'snapshot' of the desk 1,500 times every second (the pulsating red glow emanating from the undercarriage is a cool side effect).

The data is fed back to a chip to track the mouse movement relative to its last position and accurately place the cursor on the screen. The mouse worked well on almost every surface *APC* tested it on, even glass, which is sometimes a no-go territory for optical mice. The only surface it struggled with was a hard, white glass laminate.

At odd intervals, a window popped up to advise that the mouse had changed radio channels. We weren't able to determine why this happened, and just had to tolerate it.

The device has intelligent power management and a sleep mode, and Logitech claims it can operate for between two and three months on a pair of AA batteries.

The Cordless MouseMan's subtly contoured shape is quite comfortable in both hands, but the recessed grip areas are clearly intended for right-handers. Southpaws will find it almost impossible to use the fourth button nestled into the lower-left flange of the mouse. Like other buttons, it can be programmed to activate a common Windows keystroke or function.

David Flynn

Pros Two hot technologies in one device
Highly accurate optical sensor
Cons Left-handers left out (again)

Contact Logitech Australia
Phone (02) 9972 3711
Online www.logitech.com
Price $159

1440 dpi, plus new, absolutely brilliant colours for only $279.[RRP]

SUPERIOR OPERATING ECONOMY high speed printing, parallel & USB ports, plus optional PhotoRealism and scanner cartridge.

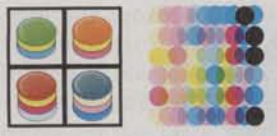


Very smart monitoring of absolutely brilliant colours.
Both the standard and optional inks have a higher optical density to produce more vivid, natural looking colours. They are contained in separately replaceable transparent ink tanks, and each is separate from the print head. A beam of light measures ink status *(right)* to allow the printer driver to alert you when they are low. You replace only one colour at a time, and because the standard inks are optimised for low cost plain paper, you can keep operating costs down.



Smart monitoring system.

Colours between the colours with optional PhotoRealism.™
Special inks allow the S400 to vary the saturation level per dot (e.g. 33%, 67%) for up to 5 times as many colour combinations as conventional CMYK inks. This result is smoother colour gradations with vastly reduced grain.



PhotoRealism produces colours between colours.



Turn your printer into a 720 dpi colour scanner with the optional scanner cartridge, pictured right.



Better print quality automatically.
The printer control software (driver) helps you maximise print quality. Photo Optimiser adjusts for defects in exposure, highlights and shadows while Automatic Tone Control reduces the 'colour noise' often common to compact digital cameras. Image Optimiser prints low-resolution Internet images up to the maximum resolution supported by the printer. All functions can be used in automatic mode.



1440 dpi, variable ink drop sizes, blacker black.
Quality is exceptional, even on low cost plain paper with resolution up to 1440 x 720 dpi, plus Drop Modulation Technology™ with variable ink drop sizes. B&W correspondence is enhanced using new, high optical density black pigment inks for superior print quality.

S400
Just $279[RRP]

USB

Parallel and USB interface. Both ports are built-in for Windows and Macintosh.[2]

Canon Customer Care.
The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support.
For more information call 1800 021 167.

3-YEAR WARRANTY OPTION

4 ppm colour
9 ppm mono

High speed printing for all colours.
Using large print heads and bi-directional printing the S400 prints up to 4 colour pages per minute. An optional, dedicated black ink tank and cartridge is capable of B&W speeds up to 9 pages per minute.[1]

Canon

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CS9808/3

Windows Media Player 7 for Mac

QuickTime and Real Player support lots of streaming media formats, but there's been a rise in popularity for Microsoft's Windows Media Format (WMF). This has been a problem for the Mac, as the development of Windows Media Player (WMP) for the Mac lagged well behind the Windows version.

Now, the Mac has caught up with the release of a Mac edition of WMP 7. It's capable of playing audio and video files using the newer WMF 8 codec, as well as older Microsoft formats and broader standards such as MP3 and MPEG-4.

However, WMP for Mac is just a player — only a shadow of its Windows sibling. There's no tuner for Internet radio or streaming vision, no support for portable devices, and you can't rip CDs or burn files onto them. WMP for Mac is only really desirable if you feel that you're missing out on WMF content online. It won't replace iTunes.

Microsoft describes audio material encoded in WMF at 64Kbps as "CD quality". *APC* found it to be slightly short of that when played through everyday speakers, but it was superior to Real Audio.



Video quality seemed much the same as Real's for any given data rate, but streaming QuickTime is superior for prerecorded content.

WMF offers larger images with "near DVD quality" for local playback at 500 and 750Kbps, but we found that a 400MHz G3 couldn't keep up and dropped frames even at the slower speed.

"Near VHS-quality" streams (250Kbps) are adequate for most purposes and within the capacity of a cable Internet connection. Few compression artefacts, other than an overall softness, were detectable.

WMP 7 requires Mac OS 8.1 or later.

As well as the standalone player, the package includes a browser plug-in to handle embedded content.

Microsoft warns that WMP 7 may have problems with WMD files (used to package multiple digital media files into one item for convenient delivery) and it did fail to play the company's own demonstration.

There's also a warning that Web page links using the Microsoft Media Server Protocol may not connect properly. Some worked, but we had to copy and paste other URLs from the browser into WMP's Open URL dialog. Some people may not be familiar with this process.

Stephen Withers

Pros More digital media types for Mac
Cons Lacks features from Windows version

Contact Microsoft
Phone 13 20 58
Online www.microsoft.com/windows/windowsmedia
Price Free

IBM 1G Microdrive

Storage on notebooks and handhelds is a constant source of pain. There's never enough of it. There are some high-capacity external FireWire drives available, but they can only be used with the very few notebooks with IEEE 1394 ports (the iBook and PowerBook for example), unless you also want to spring for a PC Card-FireWire adaptor. There are also portable, plug-in solutions such as the Trek ThumbDrive (see *APC* November 2000, page 38) and IBM's Memory Key (*APC* April 2001, page 42).

IBM has managed to find some very appealing middle ground for portable storage aficionados with the Microdrive. It is a miniature hard disk drive shoehorned into the CompactFlash form. *APC* has already examined the Microdrive in its original 340M derivation (see *APC* June 2000, page 46), which has since been licensed to Iomega.

This second incarnation of the Microdrive raises the capacity to an impressive 1G. There's something extremely unnerving about holding that much storage in a unit the size of a postage stamp.

Unlike some storage methods, such as the Memory Key, which rely on solid-state memory, the Microdrive uses a good old-fashioned hard disk drive — an exceptionally small one. While there's something comforting about the whir of a hard drive as it goes about its business, there is the very small possibility of data loss if the Microdrive is dropped or takes a sharp knock. Thankfully, the construction of the unit is quite sturdy; IBM supplies durable travel cases for both the drive and the PC Card adaptor, and once it's inserted into the PC Card slot, the Microdrive is shielded from direct damage.



The Microdrive slips into any handheld with a Type II CompactFlash slot, which covers most Windows-based Pocket PC devices, as well as the Palm OS-based TRGpro. The supplied PC Card adaptor makes it equally at home in any notebook. *APC*'s test notebook running Windows Me automatically recognised the Microdrive. We didn't need to load IBM's driver floppy or even reboot. In a matter of seconds, the notebook had an extra 1G to play with, making this perhaps the fastest hard drive upgrade available. Copying a 30M file to the Microdrive took just over 30 seconds, which is average for a hard drive.

While a hard drive requires more power to run than flash memory, *APC* was hard pressed to notice a real difference in the battery life of our test notebook.

The price might seem high, but when you consider that solid-state CompactFlash cards can cost up to $300 for a measly 64M, $989 for 1G is very attractive.

Alex Kidman

Pros Huge storage
Very portable
Cons Small size means could be easy to lose

Contact IBM
Phone 1800 289 426
Online www.ibm.com.au
Price $989

Super fast dual print heads,
1440 dpi, 6 ink colours. $329.[RRP]

ULTRA HIGH SPEED, superior operating economy, whisper quiet and brilliant quality. Plus optional 6-colour PhotoRealism.

Advanced print head system.
The compact body utilises a dual print head system designed to satisfy the needs of even the most demanding user. Speed, plain paper quality, extra rich blacks, individually replaceable transparent ink tanks plus optional 6 colour PhotoRealism and high definition colour scanning. The BJC™-6200 offers it all, in one of the quietest printers ever.



A smart ink monitoring system alerts users when a colour is running low. There are individual transparent ink tanks for all colours and each is separate from the print heads, significantly reducing operating costs and allowing you to replace only the empty tank.

1440
dpi plus Drop Modulation Technology

An optional scanner cartridge delivers resolutions up to 720 dpi.

Superior plain paper print quality.
Standard inks are optimised for plain paper. Resolutions go up to 1440 x 720 dpi. Drop Modulation Technology™ automatically adds variable ink drop sizes and the printer control software defines colour more in line with perceptions of the human eye.

BJC-6200
Just $329[RRP]

USB

Built-in parallel and USB interfaces for Windows and Mac[2].



Higher speed, blacker black.
A high performance engine with bi-directional printing capable of up to 3 lines per pass results in monochrome text speeds up to 10 pages per minute and colour printing up to 7 pages per minute, making the BJC-6200 easily the fastest printer in its class.[1] Plus the black cartridge employs pigment inks for a richer print density with greater water resistance.

7	10
ppm colour	ppm mono

PhotoRealism™ with 6 ink colours for even more tonal gradation.
Optional low density PhotoRealism inks may be used simultaneously with standard density colour inks. The 6-colour system delivers life-like reproduction, especially on higher paper grades. Tonal gradations are smooth even in difficult to reproduce colours such as skin tones and light, glossy surfaces.



3-YEAR WARRANTY OPTION

Canon Customer Care.
The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

Canon

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We want more!

We welcome comments and suggestions. Send correspondence to **APC Readers' Say, PO Box 37, Sydney NSW 1028**, or email **apc@acptech.net**. Letters can also be submitted online at **apcmag.com**. All correspondence becomes the property of *APC* and is subject to editing.

Cheap broadband for all

As a rural Internet user, I am writing to acknowledge Telstra's belated commitment to Internet services in rural and regional areas.

Support for Telstra has improved now that people in the bush can access Telstra's dialup services at local call rates, instead of being charged for long-distance calls. This recognition comes not before time; people living outside major centres have been screaming for more hours at cheaper prices. The lure of untimed dialin charges from anywhere in Australia will no doubt see a huge number of new and old customers joining the BigPond Home Internet service.



Now, we need to take a further step in relation to broadband technology. Telstra have slashed prices for their satellite service, but it is still out of reach for most Australians. Another 25% to 35% off the monthly pricing plan could have the cost as low as $10 per week.

Lower prices will enable more ordinary Australians to take advantage of broadband Internet services that include rich multimedia content. For instance, we can now log on to the ABC's Web site and view the latest news in streaming video format. These services are designed for broadband connections and are impossible to view with current dialup speeds available in the bush.

Telstra may have won some friends with this 'show of heart', but the increasingly bandwidth-heavy applications on the Web require data to be delivered at very high speeds (200Kbps or more). It's time to bring broadband into the homes and businesses of people with below-average Internet speeds and allow us to take advantage of everything the Internet has to offer.

A reduction in the cost of satellite Internet services would help ease the widening gap between city and country in terms of quality connection speeds. Most of us living on properties are barely able to reach 24Kbps, whereas our city counterparts can achieve much higher speeds on fibre-optic lines.

Cheaper broadband satellite services can easily overcome the problem of poor connection speeds, and the pros far outweigh the cons. With Telstra making record profits, don't tell me it can't be done.

Jamie Press
Internet

Letter of the month



Want to win a Microsoft Office 2000 Value Pack?

The most interesting letter sent in during the month of June will win its writer a free set of the world's most popular personal productivity tools: Microsoft Office 2000, Publisher 2000, Encarta 2000, Norton AntiVirus 2001, an IntelliMouse Explorer and more. It's worth $699, but could be yours for free. The winner of this fantastic prize will be published in *APC* August. This month's winner is Jamie Press.

Yes, quite

The landscape is electronic. A white ticks away the tide, otherwise all is dark. It is a short for Cannes. Originally this was a Japanese television advertisement. The white is derived from a flower lotion, this was designed for scientific impact. We did not deserve it munching our TV snack.

Richards Endzins
Melbourne Vic

Ed note: *Don't ask us.*

Long live Linux

I am writing in response to Dave Lenihan's letter 'Less Linux, please' (see *APC* May, page 42). In 1981, I bought my first computer. Ah, what memories . . .

Years later, I caught the bug again and bought a computer with Windows. My enthusiasm soon waned; blue screens, DLL hell, a corrupt registry — argh! Had the PC really come that far?

Then I saw an article in *APC* on Linux, which mentioned the forthcoming Pocketbook. I bought a copy and soon had a dual-boot Windows/Linux system.

There was a lot to learn and printed material on Linux was hard to come by. The Pocketbook became an invaluable resource, as did the articles in *APC*.

Linux doesn't have the pizzaz of Windows, and it's harder to use, but its stability and configurability outweigh these minor problems, plus I have a choice of software. If a problem arises, the system doesn't come crashing down, and there is plenty of guidance available from the Linux community.

Keep it up!

David Underwood
Internet

Keep it diverse

In response to the letter regarding too much Linux, I could not agree less. I use a Windows 2000 machine, as Macromedia's UltraDev is a great Windows/Mac program. However, I also dabble in Linux. I have bought the Linux Pocketbook and now have a Linux server running. I read the Mac OS, Java and C++ every month.

If I have one criticism, I would say get rid of the opinion pieces and give us more hands-on stuff.

Steve Davis
Internet

Winning subscriber

By subscribing to *APC* in our April issue, G Beumer of Buderim, Queensland has won an Adobe Design Collection software package valued at $3,250.

Conditions of entry

These conditions apply to all competitions in *APC* June, unless specific conditions are provided with the competition. Instructions on 'How to Enter' form part of the Conditions of Entry of all competitions in *APC* June. Entry is free and open to all residents of Australia other than employees of ACP Publishing Pty Ltd (ACN 053 273 546), suppliers of competition prizes, their families and associated agencies. The contests close last mail June 19. Enter according to the instructions supplied with the individual competitions. The judges' decision is final and no correspondence will be entered into. No responsibility is accepted for late, lost or misdirected entries. All entries become the property of ACP Publishing Pty Limited, the promoter, 54 Park Street, Sydney NSW 1028. The prizes are not transferable or redeemable for cash. Any change in the value of the prizes occurring between the publishing date and the date the prizes are claimed is not the responsibility of the promoter. Winners will be notified and their names will be published on **apcmag.com**.

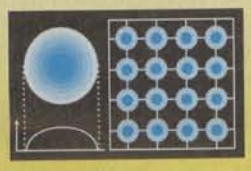
2.88 million microfine droplets per square inch. Just $649.RRP

PHOTO PRINTING with zero-graininess image quality beyond the limits of human eye-sight thanks to 2400 dpi, 4 pico-litre sized drops, 6 ink colours and 49 tonal levels.

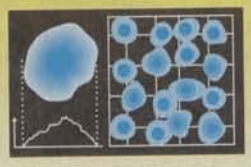
Star shaped nozzle.



High precision dot control.



S800.



Lower-level technologies.

Smaller, better ink droplets.
A unique Canon process called MicroFine Droplet Technology™ produces 4 pico-litre ink drops. Using a special star shaped nozzle each droplet is created to be centre-weighted and near perfectly round for more accurate placement.

MICROFINE DROPLET TECHNOLOGY

2400
dpi plus Microfine Droplet Technology

2400 dpi, super low density ink.
Precision placement with 2400x1200 dpi allows 2,880,000 dots per square inch using inks approximately 1/6 the density of normal inks. This gives an apparent dot size corresponding to 0.67pl of regular ink, enabling photo printing equivalent to approximately 1800 dpi.





USB

Parallel and USB interface. Both ports are built-in for Windows and Mac.[1]

SuperPhoto mode, 49 tonal levels.
In SuperPhoto mode the S800 can print up to 42 ink droplets per pixel. This allows the printer to achieve 49 tonal levels with zero graininess, even in highlights or gradations where dots are normally distinguishable.

S800
Just $649RRP



Extra large print heads with 6 transparent ink tanks.
There are 256 print nozzles per colour for a total of 1,536 on the print head. Separately replaceable, transparent ink tanks and a smart monitoring system help maximise operating economy.

Canon Customer Care. The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

3-YEAR WARRANTY OPTION

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Sensationalism? Shame? Degradation? It's all part of the surprisingly salacious early computing industry.

Cover up

What do Tarzan, a bunch of stormtroopers, ET and two semi-naked women have in common? They have all graced the front cover of *APC*.

In the early 1980s, *APC* employed some extremely eye-catching, yet questionable tactics to draw public attention to the new 'micro-computer'. Early PCs might have been downright ugly, but *APC* were masters at dressing up new technology.



▲ *That cover*

APC's first editor, Sean Howard, set the tone with the infamous December 1983 cover, which featured two scantily clad women photographed (from the neck down) on a beach. The link to PCs? Well, they *were* carrying bits of computer hardware. The headline read "Computers in the great outdoors: We look at an Australian 'do it anywhere' micro". Howard now devotes his sophisticated wit and good taste to the board of Optus.

Now, instead of these 'classic' *APC* covers, we have arresting images of technology-inspired creativity, as well as CDs full of cool software — and readers seem to approve of the trade-off.

Imaginative covers first emerged in November 1980, when the sixth issue of *APC* featured a drawing of Tarzan with the headline "Hacking through the printer jungle: A 'Jane's Guide' to all the options". It's an interesting concept, but no reference is made inside the magazine to Tarzan or the jungle, and there is certainly no explanation of just what exactly a 'Jane's Guide' is. It doesn't sound like the women's movement had filtered through to *APC* yet.

In December 1982, *APC* looked to Hollywood and the highest grossing film of all time to grab readers' attention. "ET: the film is the hit of the decade. But how good is the game?" asks the cover headline.

Not very, according to *APC*. Spielberg may have had a hand in developing the cartridge game, but the pixelated ET's search for an interplanetary telephone failed to pull the heartstrings of *APC*. Quite the contrary; *APC* lamented that it was impossible to *kill* ET in the game. The meanest thing the reviewers could do was steal ET's candy. However, the real reason *APC* slammed the game seemed to be that the reviewers couldn't get ET's spaceship to land — even after he phoned home.

The blockbuster cover must have been a hit with readers because, in November 1983, the final battle of *Return of the Jedi* made the cover. This somehow related to the 'return' of the now-defunct Atari computer. There was no reference to the Star Wars saga in the entire magazine, yet the movie *was* very popular, and the Ewoks *were* very cute.

In February 1985, another game character made the cover — the two-headed Zaphod Beeblebrox from The Hitchhiker's Guide to the Galaxy game. Author Douglas Adams was involved in developing "the game of the book of the play of the TV series of the radio program". Unlike ET, *APC* found this strategy role-playing game "genuinely funny and challenging". These were the days when games were so important to the PC industry that *APC* included the game review in the software review section of the magazine. This was really the most taxing thing you could do with these early PCs.

The only literary figure ever to make the cover of *APC* was Sherlock Holmes in January 1983. *APC* was running "a treasure hunt for the information age", where readers had to solve a puzzle involving a 'palindromic integer'. Can an 1880s crime fiction character solve a 1980s computer programming problem? "Elementary, my dear Watson."

Next month: The *APC* sealed section.

Fiona Angus



Portable, cordless, small and smaller. From $399.[RRP]

PORTABLE PRINTER CHECK LIST

IrDA for totally cordless operation.



High speed black.



Four-colour print head.



Optional colour scanner cartridge for images, fax and OCR.[4]



PhotoRealism.



Both fit into a briefcase.



WONDERFUL IDEAS FROM CANON for people needing a portable printer. Choices in size, weight and performance enhancement.

BJC™-85.
Super powerful portable printer, international adaptor standard.

It fits easily into a briefcase, but offers desktop quality and flexibility. An international power adaptor is standard and a sheet feeder is built-in. IrDA 1.1 plus parallel and USB interfaces for printing from Windows®, Windows® CE and Mac® are standard. Gold standard photographic printing via PhotoRealism™ and a long-life NiMH battery kit are available as options[2].



BJC-85
Just $399[RRP]

BJC™-55.
Ultra small, ultra light, including Li-ion battery.

Weighing only 900 grams, the BJC-55 is approximately ½ the size and weight of the BJC-85. Using the included battery and IrDA interface it is capable of cordless communications out of the box. An international AC power adaptor is also included.



BJC-55
Just $649[RRP]

High quality colour, high speed black and white.

A four colour print head with resolution up to 720 x 360 dpi comes as standard. Both printers accept an optional dedicated black ink cartridge with 128 print nozzles for print speeds up to 5 ppm[3].

Exceptional colour optional PhotoRealism.

Using standard inks optimised for plain paper, both printers automatically print high quality images using Drop Modulation Technology™ with variable ink drop sizes. The optional PhotoRealism ™ system offers exceptional photographic printing.





Image Optimiser can "correct" low-resolution Internet images up to the printer's maximum resolution.

3-YEAR WARRANTY OPTION

Canon Customer Care.
The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

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The dot com crash started the contraction of the IT industry, but the next boom could be in sight.

The IT recession



Jeremy Horey

Jeremy Horey is a senior consultant with Com Tech. He can be contacted at jhorey@ozemail.com.au.

The views expressed in this column do not necessarily reflect the views of Com Tech.

The long boom is over. The IT industry has had mini-recessions before, when growth rates dipped, but it has never faced a real contraction such as the one it faces now.

This all started with the dot coms last year, but the problems have spread to the mainstream IT industry. Companies are trimming profit projections, and even the mighty Microsoft is not growing as fast as it was 12 months ago.

There is no need to repeat all the bad news. However, it is time to consider what it means. The dot com debacle struck two blows against the rest of the computer industry. As the money dried up, so did the reckless expansion, and with it the demand for hardware, software and services from new companies flush with venture capital funds. As companies laid off staff, they no longer needed new accounting systems or PCs. As dot com companies tried to minimise their burn rate, IT budgets were savaged.

Then, as companies began to fail, their almost brand new computer equipment came on the market at bargain basement rates. When dot com startups were bought by more established players and people were made redundant, more PCs became available to replace new purchases, so the dot com failures took some demand out of the market.

Add to this a general decrease in demand as the growth in the home market slowed. The growth in home PC use could not keep going at the rate it was. The boom was partly fuelled by people wanting Internet access, and this was no longer such a strong driver as the growth in new Internet users also slowed.

The IT recession is going to lead to a rationalisation in the number of companies in the sector. This will take some time, as companies compete fiercely for the remaining sales. A good example of this is the price of a PC in Australia. Our dollar is as low as it has ever been, meaning companies are paying more or starting to pay more for their imports, as contracts run out and are renegotiated using the lower dollar. However, PCs are as cheap as they have ever been.

Rationalisations usually take between 18 months and two years to work through part of the IT industry. There is no reason to expect anything different this time. This rationalisation may be more severe than before, but you can be sure that the biggest companies will still be standing at the end of it. IBM, Microsoft, Sun, Cisco, Compaq and SAP are all still going to be around in 18 months' time. The companies that will fall will be the medium-sized companies with a fundamental weakness, and smaller companies that play around the edge. Some of these will be taken over by bigger players and others will disappear quietly.

There are new opportunities opening up as wireless and broadband move forward.

IT companies are still scrambling to incorporate Internet technology in their products. Companies that use a lot of IT can see the benefits that Internet technology brings: the simplification of systems, easier management, platform independence, and the ability to integrate with partners and customers outside the enterprise boundaries. They are moving rapidly now to take advantage of these technologies and are looking for enhancements from their supplies, or else for new suppliers who can make these things happen.

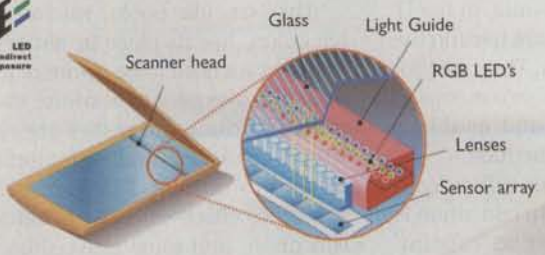
The good news is that this contraction is not permanent. The dot com failures will end and demand will slowly pick up again. There are new opportunities opening up as wireless and broadband move forward. In fact, broadband may well fuel a new boom time as we see really compelling content delivered into people's offices and homes.

It's not *just* a scanner, it's a Canon for only $119.[RRP]

SLEEK, SIMPLE TO USE scanners with patented LIDE Technology, pass-through parallel connection and full software suite.

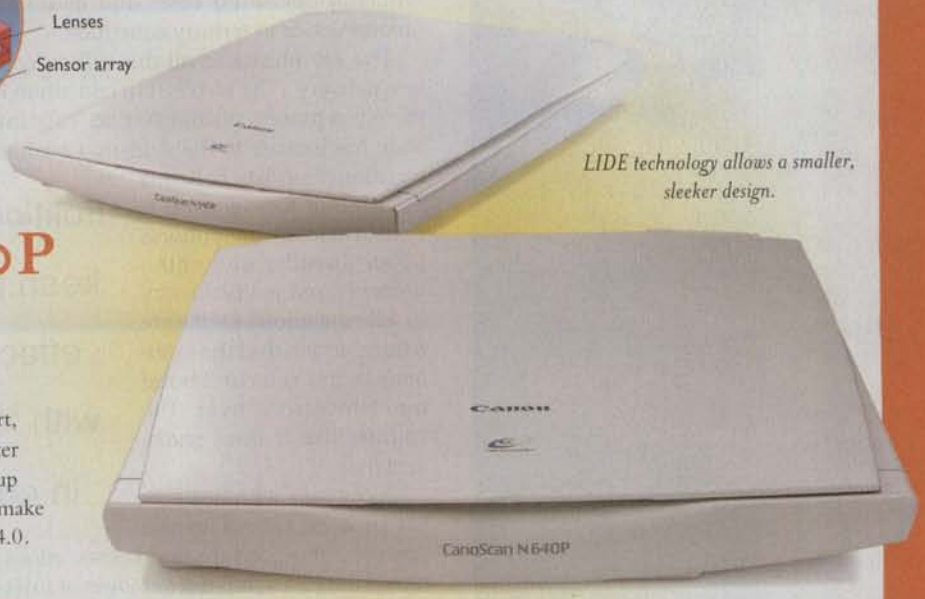
Introducing LIDE.™

LIDE (LED Indirect Exposure) fundamentally changes the way scanners work, and their price/performance ratio. LIDE eliminates the need for costly, complex optical mirrors, while it maintains image quality and colour clarity in two super slim, sleek scanners. The CanoScan N340P (300 x 600 optical dpi) and CanoScan N640P (600 x 1200 optical dpi).





Easy to use.
The ScanGear Toolbox (pictured above) lets you select functions and the final destination of your scan such as printer, e-mail program, fax, copy or others,[1] and automatically makes settings for you.



LIDE technology allows a smaller, sleeker design.

300 x 600 dpi

CanoScan N 340P

Just $119[RRP]

Getting started is remarkably easy.
Your scanner plugs directly into the parallel port, or hooks up as the middle link between a printer and your PC. Quick-and-easy CanoScan™ Setup installs the included software, and you're ready to make your first scan with Windows 95/98/2000/NT 4.0.

Full software suite, 42-bit colour input.
The CanoCraft CS-P software works for both stand-alone image acquisition, and as a TWAIN driver for other applications. Advanced controls for colour matching and image definition allows various pre-scan settings such as selecting the scan area and adjusting resolution up to 9600 dpi[2] with up to 42-bit colour input. The software package also includes ArcSoft PhotoStudio 2000 for photo-editing and Caere OmniPage Pro for converting scanned documents into editable text data, plus a CD ROM with user's manual.



CanoCraft makes high quality colour easy.

42 bit input

600 x 1200 dpi

CanoScan N 640P

Just $149[RRP]

Canon Customer Care. The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

3-YEAR WARRANTY OPTION

Canon

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Is it time to trade in traditional approaches to education for virtual universities?

A virtual education



Gabrielle Kuiper

Gabrielle Kuiper rides her bike everywhere and works across the science/policy, human/environment, oral/written, advocate/academic and paper/electronic divides in the hope of contributing to positive social change. She can be contacted at Gabrielle.Kuiper@uts.edu.au.

Since the Australia Institute first released its study into the state of tertiary education in January, falling academic standards and the perilous state of Australian universities have been regular front-page news. Meanwhile, in the IT pages, Internet evangelists are touting the benefits of online education. They are promoting 'virtual universities' as a means of reducing operating costs and enabling greater access to tertiary education.

The key phrase in all this talk is 'content delivery'. The idea is that education is merely a process of transferring 'content' from the lecturer to the student. Communication theorists call this the conduit metaphor. It is here, where the metaphor is taken literally, and entrepreneurs and politicians try to sell education as if it were a hamburger, that the problems begin. You can't hand an education over the counter like a thick shake and fries.

Politicians seem keen to replace effectiveness with 'efficiency' in education.

As anyone who has ever sat in a classroom in the presence of a good teacher knows, education is not just about a set of ideas or information, but a complex interaction between teachers and students. Students are far more complex than their choice of Big Mac or tofu burger, and this is what makes teaching such a challenging profession. Good teachers know this and adapt their teaching styles appropriately. In face-to-face lessons, teachers can respond immediately to their students. Online education cannot adapt in real time to the needs of its students in this way; it can only provide bland 'universalistic' content, or culturally specific content that will only be appropriate to particular students.

That's not to say that online educational resources, whether they are online video archives, animations or 'interactive' teaching programs, cannot be useful. However, such resources can only be a supplement to, not a substitute for, traditional education. Traditional education has been successful for centuries because it allows interaction between teachers and students — an irreplaceable combination of guiding and questioning, speaking and listening.

The Net, like books, microscopes and television, has its place in tertiary education, but we need to be aware of its limitations. We also need to be aware that moves towards virtual universities are combined with decreases in funding for tertiary education in Australia. Politicians seem keen to replace effectiveness with 'efficiency' in education, and some universities seem to be prioritising technology over human resources. Without lecturers, there will be no-one to give traditional lectures, let alone create online educational resources.

Cynics may suggest that the result of investment in virtual universities is the transfer of money from academics to corporations, especially in the IT industry, and the transfer of control of education from experienced researchers and teachers to university management and external business people. Such trends could be seen as being in keeping with the current political climate.

The danger is that as more funds are spent on creating 'click universities', less funding will be available for physical universities. There is also the danger that online education will not be cheaper; that the costs of the technology and the staff time required to learn and keep up to date with the technology and respond to online communication from students will be significantly more expensive than people meeting and talking in lecture halls and tutorial rooms. This 'old-fashioned' style of education is not cheap either, but it is a country's best investment in its future. Most Australian politicians have benefited from 'real universities', and they need to acknowledge that investment in people, not just technology, should be at the heart of education policy.

Plug and play USB, push button simplicity 600 x 1200 dpi, just $189.[RRP]

THE MOST COMPACT flatbed scanner on the market, 600 x 1200 dpi, 42-bit colour input and push button simplicity.

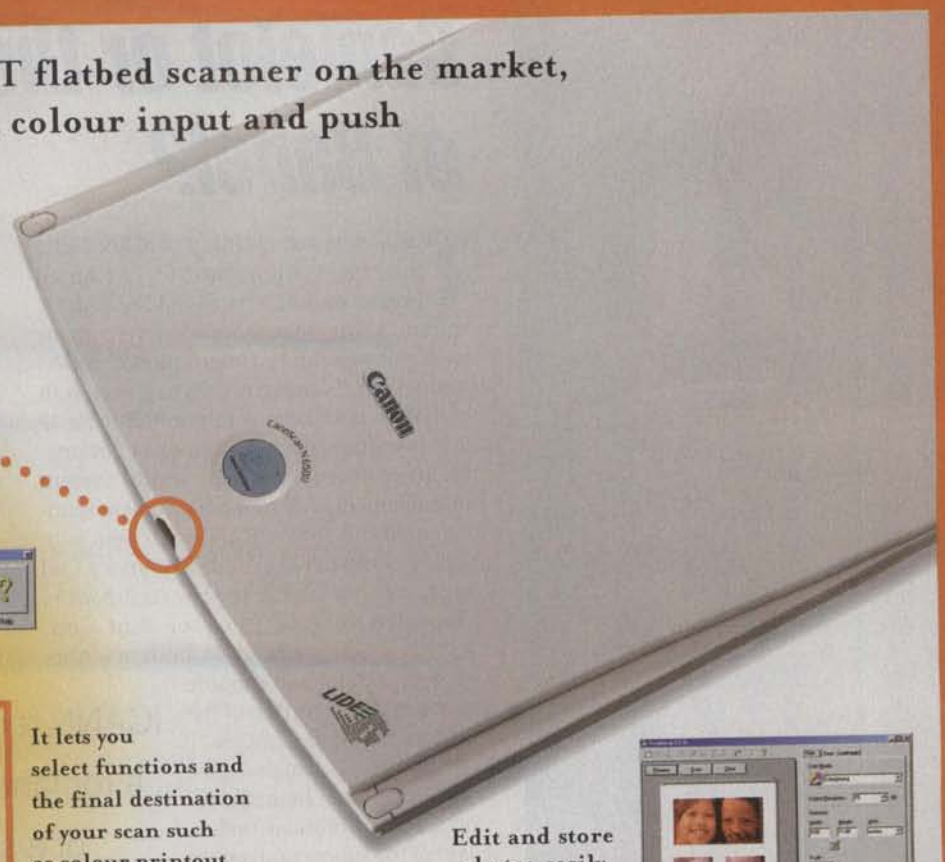
Push button simplicity, unconventionally silent.
A one touch scan button activates ScanGear Toolbox CS (the scanner control software).







It lets you select functions and the final destination of your scan such as colour printout, e-mail program, fax, copy or others,[1] and makes the necessary settings for you.



Edit and store photos easily.
ArcSoft PhotoStudio 2000 is an easy to use image editor, and ArcSoft PhotoBase creates photo databases. Adobe Acrobat Reader and PDF manuals for Windows and Mac are included.

High powered scanning with LIDE.
Patented LIDE™ technology delivers optical resolution up to 600 x 1200 dpi with 42-bit colour input. ScanGear CS offers direct scanner control and is a universal *TWAIN driver for other applications.*
It lets you make pre-scan settings such as selecting the scan area and adjusting resolution up to 9600 dpi.[2]

LIDE LED Indirect Exposure



CanoScan™ N 650U
Just $189[RRP]

Plug 'n play USB for Windows and Mac.
The USB interface is compatible with Windows 98/2000 and Mac OS 8.5 or higher[3]. It lets you plug in or disconnect your scanner without having to turn off your computer first. And, because the scanner is powered directly through the USB cable, it does not need a separate AC cable.

USB



42 bit input

"Z-lid", advanced OCR.
This special lid simplifies book scanning and OCR with the bundled Caere OmniPage Pro[4] converting scanned text into editable data.

Canon Customer Care. The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

3-YEAR WARRANTY OPTION

Canon

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Kimberley Heitman

Kimberley Heitman is a Perth lawyer and chairperson of Electronic Frontiers Australia. He can be contacted at kheitman@it.net.au.

Self-regulation of the Internet is a worthy ideal, but Australia needs to get involved in the process.

Camelot or the tower of Babel?

The Melbourne meetings of ICANN (the Internet Corporation for Assigned Names and Numbers) held in March, continued the organisation's development as a self-regulatory, international governance body. Formed in 1998 as a nonprofit corporation to assume responsibility for IP address space allocation, protocol parameter assignment, domain name system management, and root server system management functions, ICANN has been subject to many attacks on its legitimacy and independence. Under its new chairperson, respected Internet pioneer Vint Cerf, ICANN is now poised to establish new rules for the global domain name space and governance of the various national registries.

ICANN has a high degree of participation by individuals in its constituent bodies. Two of the supporting organisations are technocrats who decide on the development of protocols and assigned numbers. However, the Domain Name Supporting Organisation (DNSO) is a patchwork of interest groups and individual activists who tackle the most interesting issues: domain names, the methods and processes for allocating them, and the types of names that are recognised by ICANN. The DNSO comprises a number of constituencies which represent special interest groups such as registrars, registries, IP lawyers and ISPs. These constituencies are made up of a number of interested parties that travel from one ICANN meeting to the next, each pushing their own barrows, as ICANN attempts to find an international consensus for its future activities.

There are so few people actively involved in ICANN's processes that policy making is the preserve of a small number of dedicated players in each constituency, and the DNSO General Assembly and Names Council are forever at risk of 'capture' by commercial or other interests. ICANN has attempted to build a broader membership through the Members At Large process, where individual Internet users vote for ICANN board members to add legitimacy and democracy to ICANN's processes. Unfortunately, this experiment produced lukewarm results, and it is presently the subject of several official and unofficial ICANN studies. The process was corrupted to an extent by a surge of nationalism that led to many thousands of Internet users in several countries — notably Germany, Japan and Korea — being urged to enrol to vote so that a candidate from that country would be elected.

The 500 Australian Internet users who enrolled to vote were swamped in the Asia-Pacific voting region by the mass, top-down enrolment of tens of thousands of voters in Korea, China and Japan. Other populous nations in the region, such as India and Pakistan, were also ignored, as the candidates campaigned on the issue of national identity. The Asia-Pacific region elected a US-based Japanese candidate, the European region elected a German 'hacktivist', and the African and South American candidates were elected by a handful of votes from an uninterested electorate. Only in the North American region was there a hotly contested election, with ICANN critic Karl Auerbach winning from a wide and well-qualified field.

> ICANN represents a romantic ideal of a self-regulatory Internet governance organisation.

ICANN represents a romantic ideal of a self-regulatory Internet governance organisation, free of commercial or governmental pressures, and representing the global public interest in the safeguarding of the Internet. It's by no means a reality yet; it has not achieved its aim of taking over the 'root DNS' from the US government, nor has it commanded the support of the national registries that should be its funding members. Australia needs an independent Internet governance body operating at an international level, and the next few months will show if ICANN is the one.

Super high resolution in a *super sexy* scanner, just $299.[RRP]

SCANNER BREAKTHROUGH. 1200 x 2400 dpi, 42-bit colour input and LIDE technology in an ultra compact case.

42 bit input

Semi-professional scanning with LIDE.
Canon's patented LIDE™ was a flatbed scanning breakthrough that changed the price/performance ratio while maintaining image quality and colour clarity. The CanoScan™ N 1220U, with 1200 x 2400 optical dpi and 42-bit colour input, demonstrates the evolution of this technology, delivering "semi professional" quality in a super slim, super sexy looking case.



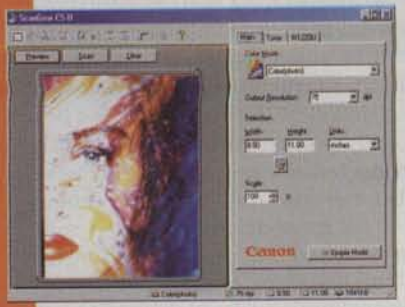


Simple, professional quality software.
The one-touch scan button activates ScanGear Toolbox CS to select functions and the destination of your scan such as colour print out, e-mail program, fax, copy or others,[1] and makes the necessary settings for you. ScanGear CS offers direct control for pre-scan settings such as selecting the scan area and adjusting resolution up to 9600dpi.[2] It is also a universal TWAIN driver for applications such as the bundled Adobe Photoshop LE, a limited edition of the world's most popular image editor.



CanoScan N 1220U

Just $299.[RRP]



Edit and store photos easily.
ArcSoft PhotoBase creates electronic photo albums. Arc Soft PhotoStudio allows easy image editing.



"Z-lid", advanced OCR.
This special lid simplifies book scanning for OCR with bundled Caere OmniPage Pro[4] to convert scanned text into editable data.

Plug 'n play USB for Windows and Mac.
The USB interface lets you plug in or disconnect your scanner at any time without having to turn off your computer first.[3] And, because it is powered through the USB cable, the scanner does not require an AC cable.

USB B

3-YEAR WARRANTY OPTION

Canon Customer Care.
The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

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CS980859

Having your own Web address can be a thrill, but a good name can only get you so far.

Name your domain

Registering a domain name is like buying a home that you can never pay off — to keep living in it, you have to keep paying fees. The price of registering a domain name through an Australian domain seller varies enormously. This suggests that some domain sellers are exploiting the ignorance of new Internet users. Australian agents charge between $66 and $249 to register a .com domain name for two years.

However, prices are expected to drop during the next 12 months as the local domain name industry opens up to more competition. NetRegistry predicts falls of up to 50%.



All .com.au domain names must be registered through Internet Names WorldWide (INWW), a subsidiary of Melbourne IT. Other domain name sellers are either 'channel' resellers, which buy domains from INWW, then resell them at a higher price, or 'affiliate' resellers, which earn a commission from INWW for each sale.

INWW charges $140 for a .com.au domain name. NetRegistry and Domain Names R-us charge the same price. Global Domain Registry actually sells names more cheaply than INWW. However, most sellers charge more than INWW for no extra service. GoDomains and JustNet (both operated by the same company) charge $220 for a .com.au name, while Oz Domains, Domain Registrations and Discount Domains charge about $200.

Domain sellers also profit from people who register numerous domain names, but never use them on a Web site. Domain names are a commodity. Some sellers, such as domainnames.com Australia, list hugely expensive domain names registered by people who want to make a fast buck. There are even domain name appraisal services.

Opportunistic domain sellers encourage buyers to register their name in the .org, .net and .com domains to 'protect' a name in each space. However, buyers should consider whether it is really worth paying for them — and for the ongoing renewal fees, which are usually the same as the initial purchase price. Be warned, you are not entitled to a refund.

As the speculative market dries up, domain sellers are looking at combining registration fees with Web hosting and email services. A domain name gives you a Web address for your site and also allows you to personalise your email address. Sellers usually offer a Web-based email account (such as Hotmail) with your domain name.

Company	Contact details	Domain	Registration for 2 years
NetRegistry	www.netregistry.com	.au.com .com.au .com	$110 $140 $110
Discount Domains	www.discountdomains.com.au	.com.au .com	$207.90 $162.80
Oz Domains	www.ozdomains.com.au	.com.au .com	$198 $165
JustNet	www.domains.justnet.com.au	.com.au .com	$220 $249
GoDomains	www.godomains.com.au	.com.au .com	$220 $137.50
INWW	www.inww.com	.com.au .com	$140 $110
Webology	www.au.nu	.au.nu	$99 for three years
Domain Registrations	www.domainreg.com.au	.com.au .com	$192.50 $137.50
Global Domain Registry	www.domainregistry.com.au	.com.au .com	$132 $66
domainnames.com Australia	www.domainnames.com.au	.com	$165
Domain Names R-us	www.domainnames.r-us.com.au	.r-us.com.au .com.au .com	$163.90 $139.70 $110

About Price Watch

Each month, Price Watch examines variations in retail pricing and service. Investigations are conducted anonymously, either by telephone contact with retailers or through pricing details supplied on their Web sites. Prices and specifications provided here are as quoted by retailers; while we assume these are correct, we cannot accept responsibility for errors or omissions.

As a guide, Domain Registrations charges $500 for a two-year .com.au email package, and NetRegistry charges $411.70. Discount Domains charges $819.50 for a two-year .com.au email and Web hosting package.

The .com domain is the most popular. US domain sellers often charge much less to register .com names than Australian sellers. You can register a .com for $US20 offshore.

The .com.au domain is designed for Australian businesses, and is more difficult to register in than .com. Unlike other domains, .com.au names are subject to tough policies that require names to be approved manually, so the extra labour forces the price up.

There are also hidden costs in a .com.au name. You must have a valid business name or number, and applying for a new one doubles the price of registering. A com.au name must be derived from your business name, must not infringe any registered trademark, and if you want to transfer ownership or hosting of the name, it must be completely reregistered.

For a cut-price domain name, you can register in an unpopular domain space such as .au.com or .au.nu. Chinese character domain names at INWW cost $90 for two years, and upcoming domain names such as .biz and .info will provide more options.

auDa, the government body in charge of the .com.au space, has warned consumers not to register a domain name for more than two years, as prices are falling. They should also beware of domain sellers who send unsolicited renewal notices to domain owners, even if the owner did not register the domain through that seller. COM.AU REGISTER is facing government-instituted legal action for this misleading practice. Consumers can allow their domain registration to lapse, or renew it with the best offer on the market.

Fiona Angus

Combined print *and* film scanner with USB, *surprisingly low* $299.[RRP]

BUILT-IN FILM SCANNING up to 1200 x 1200 dpi plus high quality photo scanning in an easy to use scanner.



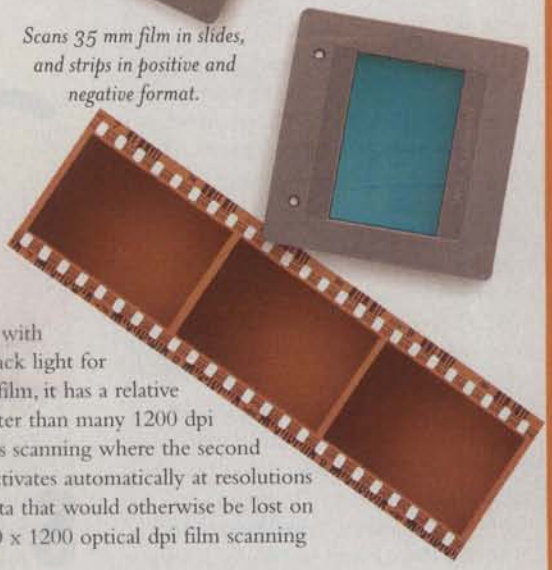
Easy to use print and film scanner with USB.

The CanoScan™ D660U solves diverse scanning needs simply. No adapters or add-on kits. Everything is built-in, and is available with the push of a button, one for photos, and one for 35 mm positive or negative film in either slide or roll format. For beginner controls, ScanGear Toolbox lets you select functions and the final destination of your scan such as printer, e-mail program, fax, copy or others.[1] Or, direct driver control lets you adjust scan size, resolution, and other parameters. The USB interface connects to either Windows 98/2000 or Mac OS systems.[2]



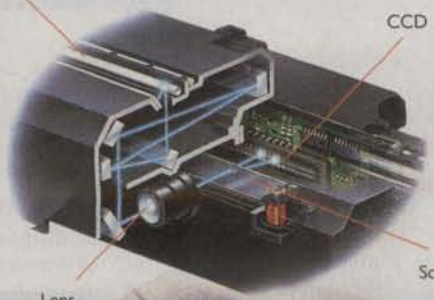


Scans 35 mm film in slides, and strips in positive and negative format.



Superior 35 mm film scanning with VAROS.™

Continuous tone colours in film pose challenges. Canon solves them with innovative VAROS technology. The scanner cover includes a built-in back light for film that reaches an extra large CCD sensor. Much like high-speed film, it has a relative light sensitivity up to 4 times greater than many 1200 dpi CCDs. Then VAROS uses two-pass scanning where the second pass is refracted by half a pixel. It activates automatically at resolutions greater than 600 dpi, capturing data that would otherwise be lost on a lesser scanner. The result is 1200 x 1200 optical dpi film scanning in less space and lower cost.







Edit and store photos easily.

ArcSoft PhotoStudio 2000 provides tools for editing photos, and ArcSoft PhotoBase creates an electronic photo database. Also included are Caere OmniPage Pro for OCR[3] (optical character recognition), plus Adobe Acrobat Reader and PDF manuals for Windows and Mac.

CanoScan D 660U

Just $299[RRP]

3-YEAR WARRANTY OPTION

Canon Customer Care.
The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

42 bit input

Advanced photo scanning and colour capture.

Photo print and text scanning resolution goes up to 600 x 1200 optical dpi with 42-bit colour input capable of capturing more than 4 trillion colours. Data can even be software enhanced to 9600 dpi.[4]

Canon

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Your Letters

Have you been ripped off or badly treated by an Australian retailer or ISP? Is anyone listening to your complaint? If not, this is your chance to tell *APC*, as well as other readers, about your experience. We'd also like to hear stories about businesses who have done the right thing by you. Our contact details are on page 64.

If your letter is published, let us know how your complaint progresses. We'll publish updates on as many of these letters as possible.

Dear *APC*,

As a small PC retailer, I get angry when I receive an email from someone seeking 'the best price' on certain PC components which has also been copied to several other retailers.

Such people email 20, 40, sometimes over 60 different retailers, trying to get them all to cut their prices. How much will they be saving? $20? $60? $200, maybe? Don't these consumers realise that this means they will get practically no support if something goes wrong? What would happen if a hard drive died? Would it be replaced straightaway? I don't think so! Not after making us go so low on the price. We would make them suffer by telling them about our return system and how it can take weeks to have something repaired or replaced.

If we gave these customers, as well as everyone else, the 'best price', how would we survive? On peanuts?

Every day we see many customers of this kind. I would be interested in how other retailers view them.

Name withheld
Internet

Dear *APC*,

I have been a loyal subscriber to One.Net for approximately three years. As a fairly advanced user of PCs and the Net, I very rarely need to contact them for support. When I do, I find it helps a great deal if some sort of response is forthcoming.

One.Net advertises its email real time customer service with great emphasis on its home page. On the three occasions I have used this service, I have received no response whatsoever. Every time I

APC's consumer writer ***Roulla Yiacoumi*** *brings you the lowdown on where to direct your complaints when things go wrong.*

Whinge all you like



Illustration by Tara Axford

Sometimes, things look hopeless. Your two-week-old hard drive has failed, and the shop you bought it from isn't in any hurry to return your calls. When you do finally get on to someone, you're given the 'We don't give refunds and it will take four weeks for the drive to be repaired' spiel. Never mind that the law says you are entitled to your choice of a refund, replacement or repair.

Many people have had the experience of buying a product or paying for a service that has failed to satisfy. If you want to take action, there are several avenues you can pursue.

The business

It's amazing how many businesses there are out there that don't care enough to take complaints seriously. Not only does the business risk losing a customer's business for good, it also risks alienating future customers, because the original customer is bound to communicate the bad experience they had to others.

Don't bother complaining by phone. You'll only be asked to come into the shop or write a letter.

When complaining in person, be polite at all times; aggression will not work in your favour. If you want to threaten the retailer with action, you might say 'Look, I'd really like to sort this out between us, but if you want to get the authorities involved, we can do that.' Whatever you do, don't imply that you intend physical violence. Similarly, if you are threatened by the shop owner, contact the police.

If you're complaining by letter, don't try to insult or offend the person you are writing to, no matter how much you want to. Be calm, and describe the problem without getting emotional. Clearly mark the date on your letter and follow it up with a phone call — two days later for an email, or a week later for snail mail. Make sure you copy your complaint to any other organisation you think may be interested.

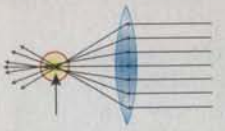
If the business does not care enough to respond, there are a number of organisations you can contact.

Department of Fair Trading

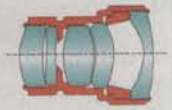
Often still referred to by its former name, Consumer Affairs, the Department of

Extraordinary resolution coupled with exceptional colour capture. Just $449.[RRP]

ADVANCED CCD, 1200 x 2400 optical dpi, fast Galileo Lens, 48-bit colour input and optional high intensity film adaptor unit.

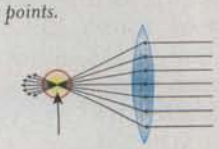


Spherical aberration – Light converges at different points.



Galileo Aspherical lens.

High-speed Galileo Lens, advanced CCD, more optically accurate.
The five-element, aspherical lens system eliminates distortion. A shortened optical path and wide aperture lens (f-stop=5.5) increase scanning speed and improved signal to noise for a more optically accurate system. A true 1200 dpi CCD sensor is capable of finer detail and more accurate colour.



Galileo Lens – Light converges at a single point.



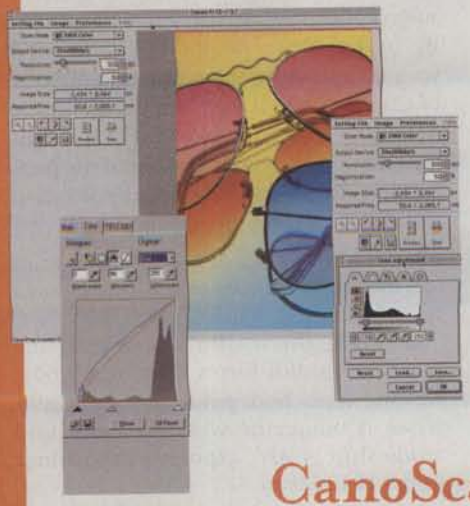
ScanGear Toolbox CS offers "point and click" simplicity.

So advanced, so simple.
The easy-to-use unit delivers studio quality 1200 x 2400 dpi optical resolution for almost the same price as many 600 dpi scanners. The USB interface connects to Windows 98/Me/2000 and Mac OS systems.[1]



Optional FAU-S12 film adaptor,[2] $199.[RRP]

High intensity film adaptor.
The optional film-scanning unit replaces the standard cover for reflective and film scanning, and matches or exceeds the performance of expensive moving light source designs. The light source in the cover uses dual sheets of 3M™ BEF film (Brightness Enhancement Film) plus dual, high-intensity cold cathode fluorescent lamps for maximum brightness. It accepts colour negatives and positives in 35 mm, 2¼" and 5" x 4" sizes.



Complete software suite.
ScanGear control software, a universal Twain Driver, PhotoShop 5.0LE, ArcSoft PhotoBase (to create and manage photo databases) are included for both platforms. ScanSoft OmniPage Pro 9.0 for Windows and OmniPage Se for Macintosh are also included for exceptional OCR performance. Canon PhotoRecord (Windows)/ImageBrowser (Macintosh) helps users to easily copy, enlarge and print photos.

CanoScan™ D1230U
Just $449[RRP]

48 bit input/colour

48-bit colour input.
True 48-bit input and 42-bit output increases subtle tonal variation and colour accuracy. Advanced controls cover gamma settings, histogram adjustment, colour curves and more.

Canon Customer Care. The one-year warranty is upgradeable to three years for a minimal charge, and is backed by Customer Care hot-line support. For more information call 1800 021 167.

3-YEAR WARRANTY OPTION

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CS0328

Your Letters

sent an email, I waited a few days and followed up with a reminder message.

I have found the only way to gain any satisfaction from One.Net is to phone it. Once I am through to a customer service officer, to give credit where it is due, they have been helpful and well trained.

One would think that, for an ISP that has been around for a while, answering emails would not be beyond their ability.

Apart from this glitch in the system, I must report that my overall experience with One.Net has been positive — but perhaps this is because I very rarely need to call for help!

Denise Freiburger
Brisbane, Qld

Dear *APC*,
It is interesting to read the complaints and comments about ISPs. I use the Austar chello service and would like to take this opportunity to say how wonderful it is. Previously, I used a local ISP to dial up. The speed was OK for 56K, but the customer service was wanting. Since changing to chello broadband, I couldn't be happier. The customer service is great, but the speed leaves something to be desired.

If you don't mind the slow upload speed, I highly recommend this service to those who have access to it. This is a true unlimited Internet package for those of us outside the capital cities. We have waited for affordable broadband Internet for too long!

Damian Harrison
Churchill, Vic

Dear *APC*,
In your last ISP survey, I gave dingoblue the thumbs up because of their unlimited use policy, but things have changed. dingoblue now has a limit of 400 hours a month, a 12- hour session limit, disconnection after 60 minutes idle time and a 1.5G per month download limit.

The reasons they won your award no longer exist and they should have it stripped.

Andrew Pattie
Northfield, SA

Fair Trading is the complaints body most people would think to contact first when disaster strikes.

However, while the department can take down your complaint and pursue it, the process can take weeks. Disappointingly, the department is not able to tell you before you make your purchase whether a particular business has a list of previous complaints against it or not. Each Australian state has its own Fair Trading office.

Australian Competition and Consumer Commission (ACCC)

This organisation has real teeth. As well as considering company mergers and takeovers, the ACCC investigates unfair market practices and breaches of the Trade Practices and Prices Surveillance Acts.



If someone is advertising a 400MHz PC when it's really a slower machine that has been overclocked, or unlimited Net access that isn't really unlimited, the ACCC is quick to act and prosecute (up to $10 million) if necessary. See www.accc.gov.au.

Business Software Association of Australia (BSAA)

If you buy a PC and suspect that pirated software has been loaded on it, the BSAA wants to hear from you.

In Australia, the BSAA represents major software companies such as Microsoft, Adobe, Macromedia and Symantec, and takes legal action against anyone who uses its members' software illegally.

When you buy a system, you should receive a licensed copy of the operating system and any other retail software you have asked to have installed. This protects you if your hard drive crashes or your machine is stolen — you don't want to have to pay for the same software twice.

Even though Service & Reliability has found that a number of smaller operators shrug their shoulders at threats that they'll be reported to the Department of Fair Trading, you'll be surprised at their reaction if you casually mention that Microsoft may be interested in what they are doing.

Last November, the BSAA won a payout of $115,000 from a college that was using illegal copies of various software packages. The college's former principal brought the infringement to the attention of the BSAA.

The BSAA's piracy hotline can be contacted on 1800 021 143, or see www.bsaa.com.au for more details. As an added incentive for dobbing in an offending business, the BSAA offers a $5,000 reward for information that leads to successful action against a pirate.

Telecommunications Industry Ombudsman (TIO)

This is the place to go if you have a problem with your ISP. The TIO is responsible for complaints against all Australian ISPs and telecommunications providers. However, you need to have made an effort to resolve the problem directly with the provider first. If all else fails, contact the TIO on 1800 062 058 or visit www.tio.com.au.

The TIO can investigate billing, access, customer service, privacy and contractual issues.

People in power

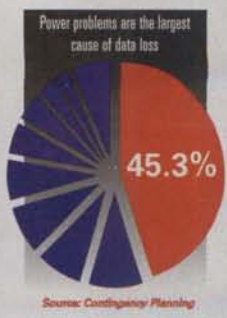
Complain to people who are in a position to do something about it. Don't approach salespeople; they usually have no authority to give you your money back. Send your complaint to the managing director of the business. If you bought the faulty item after seeing it advertised in a magazine, send a letter to the editor of the publication. If your dodgy item was purchased from a market, contact the organisers (if it was held in a school or town hall, you can call the school directly or the local council to find out these details).

Finally, the media are among the most influential forces there are today. No-one likes bad publicity, especially when a magazine with the clout and readership of *APC* exposes wrongdoings in the IT industry.

Is there a particular retailer or ISP who you feel deserves a mention in *APC*'s Service & Reliability column? Whether your experience has been good or bad, this is the place to share your thoughts. Write to me at ry@acptech.net. Letters may be edited for length or clarity. Due to the volume of mail received, we regret that not all letters can be answered personally.

Because power problems are the biggest cause of hardware and data loss, protect your computer equipment with APC

According to a study by IBM, your PC system is subject to an average of 128 power disturbances per month. Power problems range from the subtle — keyboard lock-ups and frozen monitors — to the serious — hardware damage and complete data loss due to surges and blackouts.



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- **1 Surge protected outlet** protects your laser printer from damage due to surges and spikes
- **Lightning and surge suppression** to protect your computer and its peripheral equipment from catastrophic damage
- **Noise filtration** Back-UPS protects against high frequency electrical noise that can damage files and create software errors
- **Quick battery recharge** enhanced charging technology allows Back-UPS batteries to recover from power outages as fast as possible, and ensures they are ready for the next power event

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A new invention could help the blind to 'see' again — with their tongues.

Looking tasty

It is well known that blind people often develop unusually acute hearing as the body's way of compensating for the loss of sight. However, the ear is not the only organ attracting the attention of researchers in their bid to aid the sightless. The tongue's extreme sensitivity is being harnessed to develop a 'seeing' device for the blind. The tongue has been singled out for research because of the direct way it sends signals to the brain.

The most obvious components of the tongue are the tastebuds. They are housed within protrusions on the tongue called the circumvallate, fungiform and foliate papillae, which give the tongue its bumpy look. Each papilla contains many tastebuds.

The tastebuds consist of the taste pore — a small opening to the surface of the tongue — where chemicals (tastants) from food enter. Just inside the tastebud, the chemicals interact with hair-like filaments called microvilli that sit on the outside of the bud's taste cells. Depending on the tastant's composition, different chemical reactions occur within the tastebud, and neurotransmitters are produced.

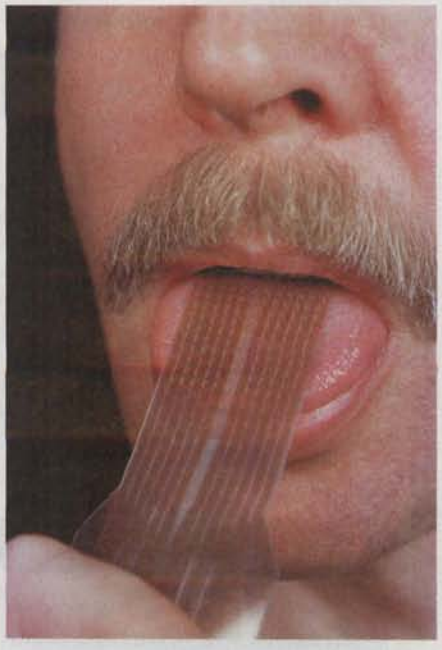
For many years it was thought that different areas of the tongue were more sensitive to different types of taste. However, the taste map (sweet at the tip, salty along the sides, sour in the middle and bitter at the back) that was created in the early 1900s was based on a misinterpretation of research performed in the 1800s. The scientific community has been trying for years to dispel the myth, as research has long shown that all tastebuds are responsive to all types of taste. Despite this, the misleading taste map is still taught in schools and universities today.

Aside from the tastebuds, there are other bumpy protrusions on the tongue that are important to how you perceive food. Positioned along the centre of the tongue, the filiform papillae give you the tactile sensation of the food you are eating — the texture. The clusters of nerve endings in the filiform papillae send messages directly to the brain.

It is this direct link to the brain that researchers at the University of Wisconsin-Madison aims to exploit with their new 'seeing' device. As project leader Paul Bach-y-Rita points out, the idea of using the tongue to see is not as bizarre as it sounds — after all, the eyes don't actually see either. They collect data about the world around us, but it is the brain that interprets that data.

The device the research team built does not produce images in the brain. It transmits tactile feedback to the wearer through the tongue. So far, experiments have been carried out with people sitting blindfolded at a computer and using the arrow keys to navigate a computer-generated, 3D landscape simulation. The computer sends information (mostly about the directions in which movement is possible) to the device. If the wearer is in a simulated room with a door to the left, the device transmits feeling to the left-hand side of the tongue.

The device is a plastic sheet embedded with 144 electrodes that lies across the surface of the tongue. The electrode array sends tiny electrical pulses to the filiform papillae on the tongue, and these are then passed on to the brain. As the electrical pulses change in the array, a sensation of movement is created on the tongue; from left to right, right to left, and forwards and backwards. At the moment, a PC is needed to coordinate the pulses, but it is hoped that small, wireless, pill-sized units can be constructed.



▲ This device may help the blind to 'see'.

The tongue is the perfect surface for this device. It is wired directly to the brain, has an incredibly dense supply of nerves, and comes with a constant, electrically conductive saline solution. Test subjects said that the device feels like a cross between something crawling across your tongue and licking a 9-volt battery, but they were able to navigate the simulated landscape using the device.

In future versions of the unit, navigational input could come from head or lens-mounted cameras providing environmental information. A similar device is being developed to help those with balance problems. At the moment, the unit is cumbersome, but future versions may be built into a dental plate that fits across the roof of the mouth and is linked to a wireless camera. US navy teams have even trialled a version for use in murky waters where there is almost no visibility.

Darren Ellis

Prion disease update

In January, Cutting Edge reported that prion diseases such as BSE (mad cow disease) and variant Creutzfeldt-Jacob disease (vCJD) cannot be slowed, halted or reversed (see *APC* January, page 60).

However, a new discovery could change this. Researchers investigating the scrapie prion have gone back to basics, investigating the immune system of mice and how it allows the prions to propagate.

Normally, the body tags foreign material to be destroyed by the immune system. This allows the follicular dendritic cells (FDCs) in the spleen to identify foreign material. One of the tags, consisting of blood proteins, is called the complement. In scrapie, the prions replicate within the FDCs, so the researchers decided to block the complement tag. This was done in two ways: using genetic engineering and with cobra poison. As a result, the disease was delayed by up to a month (quite a long time for a mouse), and in some cases, stopped completely.

This is promising for vCJD sufferers, but more research is needed to understand how the scrapie prion overcomes the complement blockage to continue spreading.

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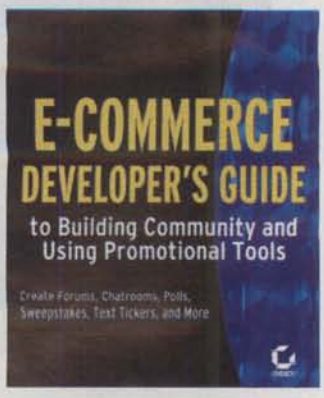
Macromedia Dreamweaver 4 for Windows & Macintosh VQSG - *J. Tarin Towers*

Now updated and revised, this excellent book covers the latest features of version 4. Step-by-step instructions and plenty of screen shots guide readers through the tools, palettes and site management properties of Dreamweaver 4. It then moves on to the more complex aspects of the software, such as automating and customising Dreamweaver. Fully updated to reflect all the latest changes in the software, this book remains one of the most useful and accessible guides to Dreamweaver. $46.95

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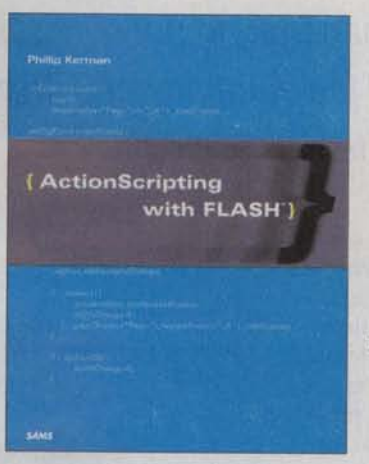


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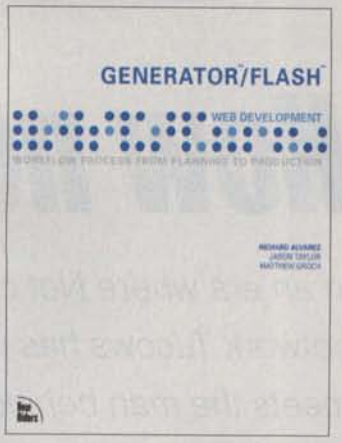


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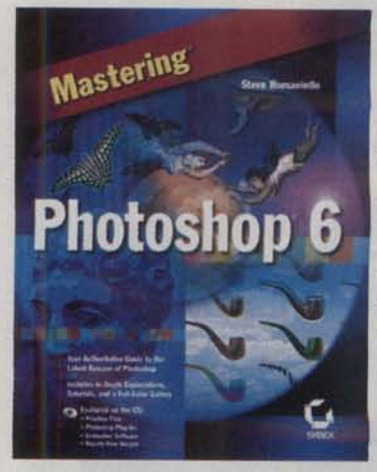


Generator/Flash Web Development

Richard Alvarez, Jason Taylor & Matthew Groch

The core theme of this book is the workflow process from initial creative inspiration to the production of an entire site. It takes you through every process of the off-line dynamic site development workflow. Each step of the development is explained and accompanied by example code and illustrations, including site flowcharts, database creation, Flash template design, and final production. The ideas covered and lessons learned will give designers and developers new tools to produce large content heavy sites in a quick turnaround fashion.

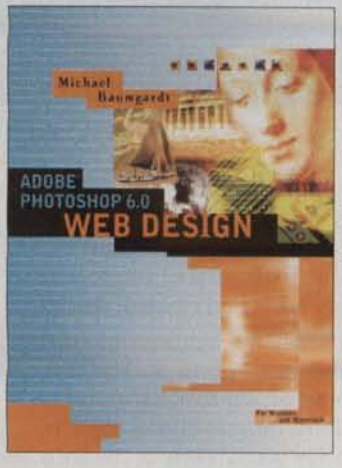
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Mastering Photoshop 6 - *Steve Romaniello*

Version 6 adds many new features to Photoshop's existing functionality, as well as an extensive set of enhancements. Whether you're upgrading from an earlier version or just beginning to work with digital images, this book is the perfect choice for learning all there is to know about the most powerful and popular graphics program in the world.

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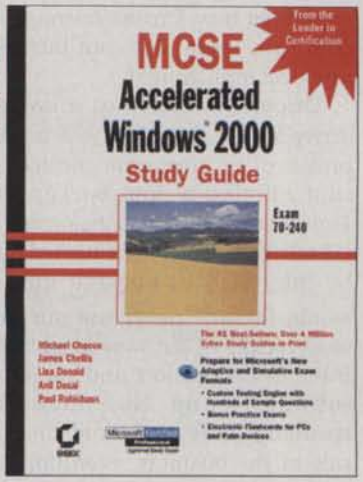


Adobe Photoshop 6.0 Web Design

Michael Baumgardt

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How now, download cow?

In an era where Net content companies are going down like bowling pins, download network Tucows has managed to not only survive, but flourish. **Angus Kidman** *meets the man behind the company and discovers why making 'as few decisions as possible' is the key to its success.*

Running a content-centric company that scorned funding from a public float, placed little emphasis on advertising, and didn't charge for its services because it preferred to make money by selling domain names, would probably strike most observers of the Net market as a sure path to ruin. However, in an industry which has seen many of its early successes (Netscape, AltaVista, Sausage) stagger from disaster to disaster in the last year, one of the pioneering download networks, Tucows, has managed not only to survive, but to flourish using just such a model. During a recent flying visit to Australia for ICANN's Melbourne meeting, and to shore up relationships with local partners, CEO Elliot Noss explained how Tucows managed to succeed as a 'pure' dot com business — a rare accomplishment.

Originally trained as a lawyer, Noss arrived at Tucows in 1997 as the vice-president of corporate services after a stint running a data backup business. That firm gradually transformed into an ISP when the customers turned out not to be interested in backing up — "they would literally never use our product," Noss recalls — but were keen to have an Internet connection and the associated software set up. Noss found himself spending more and more time on that side of the business, eventually becoming an ISP by default. "I'm a big believer that working in the ISP business in 1995 and 1996 was the best training ground for running an Internet business," he told *APC*. "Any business where the challenge is the growth curve is not a bad place to be."

The failure of his backup business also taught him a crucial, if rather obvious, lesson: sell your customers what they want. "Don't substitute your judgement for theirs. We really try to make as few decisions as possible, but we also try to be as responsive as possible."



▲ "People love cows," according to Noss, although this may not always be the case in Europe.

As Noss tells it, when he joined Tucows, the company was running one of Toronto's largest ISPs (Internet Direct), but paying relatively little attention to the download network it had created. At that point, it was solely for Windows Internet programs, and was known as The Ultimate Collection of Winsock Software, or Tucows for short. Despite almost no marketing, it quickly became one of the early attractions of the Web, as curious surfers hunted for new and better tools.

"At the time, it was just two or three people running the site, but it had 20 million page views a month, affiliates in 60 countries and over 300 networks around the world," Noss said. Remarkably, despite the immense popularity of the mirrored sites, Tucows offered the service free of charge.

The fashion for attempting to make Web sites profitable by selling advertising was just emerging then, but even though he did dabble in that area, Noss decided to pursue a different route for Tucows' growth. Rather than drawing on the user-centred model of advertising emerging from the US, Tucows began to build relationships with the ISPs who were already mirroring the content.

The company's Canadian location and international audience may also have helped to influence this decision. "Historically, we were always more popular outside North America than inside, because that's where the value proposition spoke the loudest," Noss recalled. Back then, there were only about 12 Australian companies partnered with Tucows; currently, there are more than 50.

Despite the huge potential audience (Noss admitted that there are still "millions of dollars in revenue that we generate out of advertising on the site"), he doesn't see content as a major element of the company. "We always saw it as distributing bits to the end user and the value was around the distribution business, not as a media company selling advertising."

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abi

The domain biz

What Tucows did begin offering for sale were domain name registrations. "We were always involved in the domains business because of the ISP access side. So we combined our knowledge of that space with the fact that we had a bunch of excess ad inventory, and we had a retail domains business in 1997 using that to generate sales. We recognised very early on that as things were opening up, we could provide a significant service to our ISP partners by getting into that business." However, rather than selling domain names to individuals, Tucows decided to focus on wholesale services to allow other ISPs to offer their local customers cheap domain registrations. That process was greatly accelerated when Network Solutions was forced to allow other wholesalers to sell .com domains in early 2000.

The move quickly proved successful. By March this year, Tucows' collective reseller group had overtaken Network Solutions as the top seller of .com, .net and .org domain names. Noss now plans to develop that market with other services, such as Tucows-branded digital certificates, which can also be sold through the reseller network.

That may be a timely development, if only because domain name sales are slowing down after a bonanza year in 2000. "Our market share is going up consistently, but the market as a whole has been drifting off, and that's really a short-term phenomenon around the huge growth in the first two quarters of 2000," Noss said. "It's the first time that people could really get in at a very low price, and so you saw really freakish numbers and ridiculous levels of growth quarter over quarter in those first couple of quarters last year. Now it's becoming a business, and it's much more about taking customers from other people than about the whole pie growing."

One area of growth may come from the introduction of new top-level domains such as .biz and .info, a business that Tucows also plans to enter as a reseller. However, Noss would like to see some changes in the way domain names are sold. In particular, he's a big fan of using an auction model to sell domain names (a model initially pursued by the .tv domain), rather than the current first come, first served approach.

"There is an artificial scarcity around domain names. There is excess economic value with a valuable name, so the issue is: should that accrue to a speculator or to a registry?" Noss is clearly on the side of the registry. "No-one has ever been able to say to me 'Here is why that excess economic value should accrue to someone who just happens to click the mouse fastest'," he said.

Whatever policies are used, Noss believes that the introduction of new top-level domains will help to alter the basic logic of buying and selling names. "A year from now, with the new gTLDs, it will be a fundamentally different world. We're great believers that these dot com brands will erode significantly, and then the whole concept of an extension will start to come into question."

Such a development would obviously please the many critics of Network Solutions, which has been a frequent target for complaints about its exploitation of its former monopoly in selling .com names. However, that is something Noss believes is inevitable. "I think it's impossible for a company to transition away from being a monopoly without engaging in some monopolistic behaviours. It's just habit."

Getting lucky

Like most successful Internet businesses, Tucows has had its share of luck. For instance, its name has remained the same, even though its original intention to be Windows-centric has faded since other platforms entered the market. "We don't even talk about the acronym today. I call it an anachronistic acronym," Noss said. "The fortunate thing for us is that it branded marvellously. It has a high remembrance value, and people love cows!"

Tucows also managed to avoid a possible legal threat from computer giant Gateway, a fierce defender of its own bovine-themed marketing. "The first press we ever got came out of Gateway sending us cease-and-desist letters saying 'That's the spotted logo, that's ours'," Noss said. "We couldn't afford significant legal counsel, so we took their cease-and-desist letter and posted it on the Web site. Two things came out of that. We had tens of thousands of people email them and say 'Lay off these little guys', and a lawyer at a very prominent law firm stepped up and said 'Hey, I'll help you guys out of this mess'. We have a standstill agreement with Gateway today, so you won't see us offering any personal computers for sale."

Perhaps most critically, Tucows managed to resist the urge to float as a public company. It was a move that looked deeply unfashionable at the time, but now appears to have been prescient in a market that views most dot com floats as cash-free disasters. Instead, Noss oversaw the separation of the ISP business from the Tucows download and domain business. He then stayed on as CEO at Tucows and helped organise a buyout by investor group Steinmetz Technology Holding in 1999 for an undisclosed sum.



"Steinmetz was a group that evolved out of my relationship with Yossi Vardi, founder of ICQ," Noss said. "Tucows had been the sole point of distribution for ICQ for the first 16 to 18 months. They were a tiny company and they had millions and millions of users demanding their product, so they piggybacked on our distribution, and out of that Yossi and I developed a very strong relationship. So he put together a group of investors — he was somebody who had personally experienced the power of our distribution model, so he went to some investors and said 'These guys are going to rocket, you should get involved'."

Personal factors also played a role. "We could have had money from some of the top VCs in Silicon Valley in 1998, as long as I would have moved to Silicon Valley. But you know, I'm married with a couple of young kids and I made the decision to live my life in Toronto, so we didn't go in that direction."

"We were lucky," Noss admits. "We were looking very hard at going public, but we pulled out of the process. The biggest issue there that would concern me is staff morale. It's very, very difficult for people to be there for the ride up, and then have to come down. It was certainly the case that that put us outside the general milieu and created challenges for us, but in the long run, as things tend to, it worked out for the best. Now we can focus on the business and not have to worry too much about that stuff. We never had tens or hundreds of millions of dollars in the bank, and we never developed bad habits around that."

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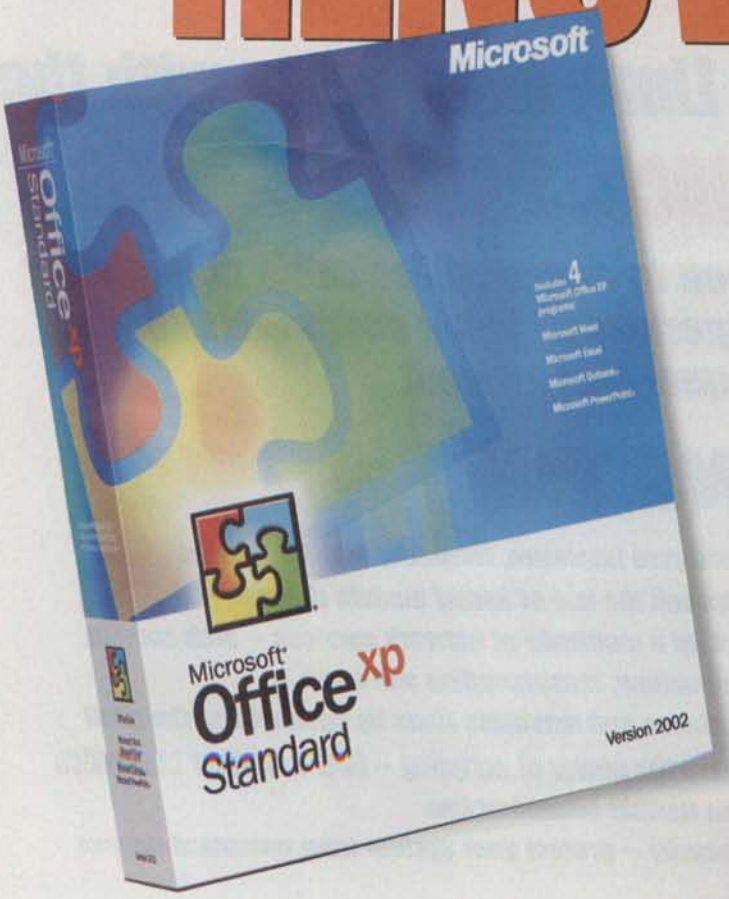


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ACP Tech

OFFICE RENOVATIONS



Office XP is here, and Microsoft will be pulling out all stops to ensure that it finds a home on your hard drive. However, should you reach for your wallet, or keep it firmly in your pocket? ***David Flynn***, ***Stephen O'Brien*** *and* ***Darren Ellis*** *investigate.*

Microsoft® Office® xp

To a certain extent, Microsoft Office has been suffering from the law of diminishing returns. The more Microsoft puts into successive versions of its 'super suite', the less it seems to be able to squeeze out of it.

Office 95 had its heyday as the perfect partner for Windows 95. It was released on the same day, as if to underscore the relationship. Office 95 debuted AutoCorrect features for spelling, as well as bulleted and numbered lists.

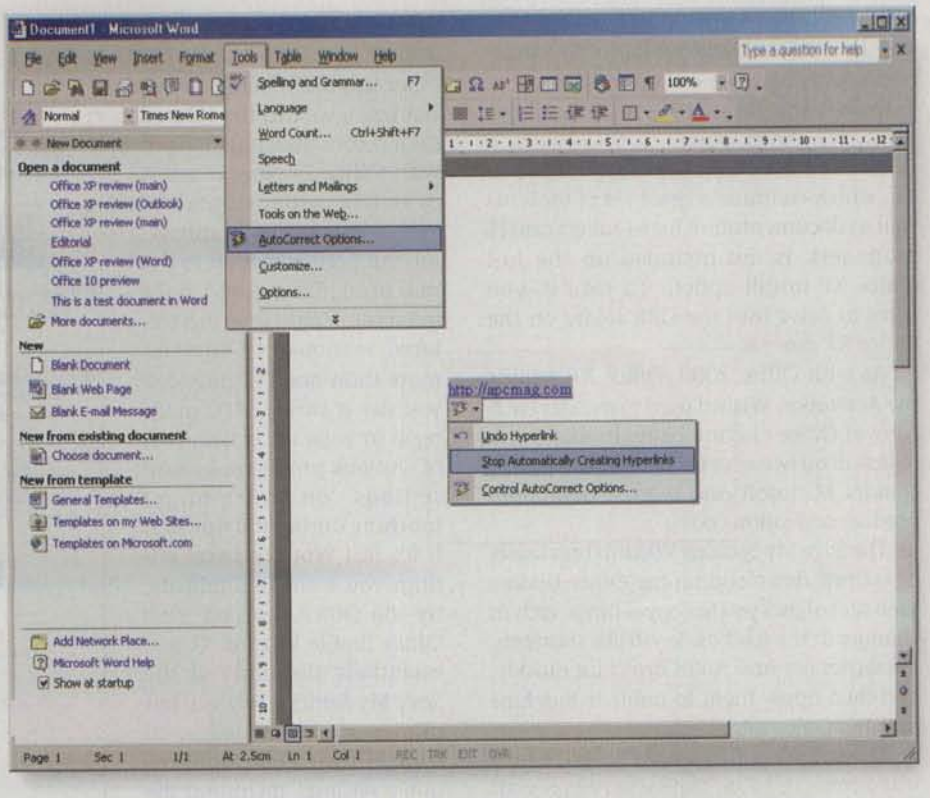
In Office 97, Outlook was an all-new addition to the family, along with the suite's first foray into the Web and teamwork, including a little-known and soon forgotten application known as Team Manager.

The Internet-savvy Office 2000 continued the trend, with Microsoft's best attempt yet at dealing with the Web. However, it wasn't quite enough. With no substantial reason to make the change, many people remained with Office 97.

The challenge for Microsoft with Office XP (which touches down on June 1) is twofold. Not only are there Office 2000 users to be weaned on to the new suite, there are also many people still happily using Office 97.

APC has been running Office XP in both its formative beta build and the final gold code. There's no doubt that this is the best Office yet — but then, that's a little like each Olympics being proclaimed 'the best ever'. Office XP is a solid piece of work. More sensitive to people's needs than Office 97, and more stable than Office 2000, Office XP contains plenty of features to make your life easier, especially if you're working in a team environment. That said, there's nothing you can't live without.

Instead of providing a single focal point for its changes, Office XP benefits from



▲ The revised interface of Office XP, seen here in Word 2002, showcases a bevy of improvements.

scores of small, but very smart, improvements; Smart Tags are an obvious standout. Microsoft has been consistently underselling the speech recognition feature. This is not because Redmond's Whisper speech engine is bad (it compares well to the popular DragonDictate), but because it fears creating expectations that no software or hardware can currently deliver.

If there's one killer application in Office XP, it's SharePoint. In truth, this isn't really an application at all; it's an online service integrated into the Office suite, and it relies on server support for the Office Extensions (formerly FrontPage Extensions) to create a collaborative, team-based Web site with tight links to the Office applications.

The now-familiar setup routine of Office is about as painless as it gets, unless your hard drive is pressed for space. If this is the case, you'll need to make some serious room for Office XP's 284M standard installation, or up to 576M for the works.

Admittedly, these are beefy figures, but bear in mind that hard disk drives have more than kept pace with the demands of

Which Office?

Office XP will be offered in four retail versions.

- **Office XP Standard** comprises the core applications of Word, Excel, Outlook and PowerPoint. Upgrades carry an estimated retail price of $534, with shrink-wrapped versions for first-time Office users coming in at $1,072.
- **Office XP Professional** adds Access 2002 to the standard package, and bumps the price up to $749 for upgrades and $1,288 off the shelf.
- **Office XP Professional Special Edition** will probably be the biggest seller, as it includes Word, Excel, Outlook, PowerPoint, Access, FrontPage, SharePoint, Publisher and Microsoft's IntelliMouse Explorer. This is only available as an upgrade for a hefty $1,029.
- **Office XP Developer** is a derivation of XP Professional that adds FrontPage and SharePoint Team Services, as well as the Office Developer toolkit for customising applications to suit corporate or vertical market needs. You can upgrade for $1,180 or start afresh at $1,679.

Box builders will have a choice of two dedicated OEM builds. **Office XP Small Business** contains Word, Excel, Outlook and Publisher, and comes closest to Office 2000. **Office XP Professional with Publisher** is just what the name suggests: the five professional applications plus Publisher 2002.

Upgrade versions of Office XP products can be installed over any version of Office 2000 or Office 97.

If you don't have an earlier edition of Office running on your PC, Office XP will insist that you insert the program CD before its installation can begin. No CD, no XP.

If you're still making do with Office 95, you're out of luck. Office XP will not recognise this as an upgrade candidate. Nor can you install Office XP on any machine running Windows 95 — the new suite will only run on Windows 98/Me and Windows NT/2000.

such applications. Memory of between 5G and 10G is commonplace for today's notebooks, as is upwards of 20G for a desktop. Even on a one-year-old PC, there should be plenty of room to spare.

APC did note that the Office Resource Kit, which contains a great set of tools, as well as documentation for tweakers and IT managers, is not included on the full Office XP install option. To load it, you have to delve into the ORK folder on the Office XP disc.

As with Office 2000, Office XP retains the Activation Wizard used to register each copy of Office electronically. It allows you to install on two systems before you need to contact Microsoft and request additional product activation codes.

The Save My Settings Wizard (previously a separate download on the Office Update Web site) allows you to copy settings such as changes to the toolbar, keystroke shortcuts, the dictionary and AutoCorrect list quickly, and then apply them to another machine running Office XP.

The snapshot file, which in *APC*'s tests was a meagre 143K, can be saved on your hard drive and manually copied on to a second PC, or stored on a Microsoft server for three months using your Passport account. There's no indication of exactly *where* in the ether the file is being saved, but when we ran the Wizard on a second machine loaded with Office XP, and asked it to restore settings from the Web, it succeeded in mirroring our preferences on to the machine. This could be a boon for people who run tailored versions of Office on more than one PC, provided you use it wisely. *APC* managed to wipe an existing set of Outlook profile and email settings on our target machine during the transfer. If it's just Word or Excel settings you want to duplicate, try the Office Resource Kit's Office Profile Wizard. This is essentially the same as the Save My Settings Wizard, but allows a greater degree of control over each application's settings, including the applications you save and those you leave alone.



▲ The Office Clipboard Task Pane

Microsoft has given Office XP a slicker interface; menu options are painted with a soft blue highlight, and icons tilt forward with a fancy 3D effect. This makes it that little bit easier to see exactly where you're pointing.

Undoubtedly, the most subtle, yet substantial improvement to Office is the introduction of Smart Tags. Tags appear in your document as an icon hovering over an object. Their contents depend on the object or action: a Smart Tag can offer to correct an error in a spreadsheet; insert the address of a name typed on to a page (if it's stored in your Outlook address book); and call up quotes and company information if you type a stock symbol (but only if it's listed on the MSN Money Central site).

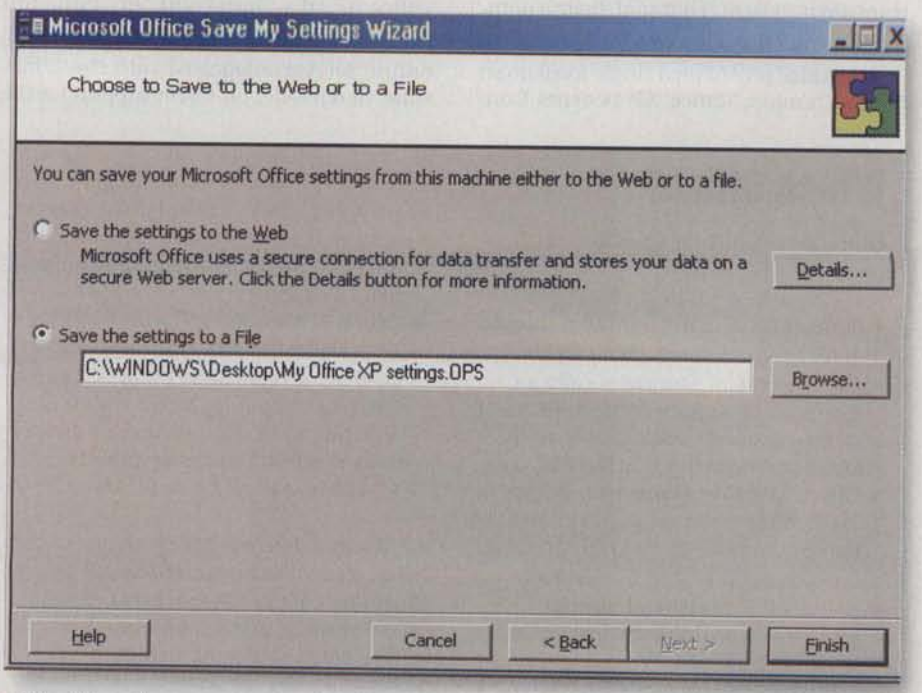
Third parties can write their own Smart Tags using XML. If the notion takes off, you can expect Smart Tags that provide legal citations, measurement and currency conversions, and even aircraft and flight details if you type a Qantas flight number into a document.

Smart Tags also help you tame Office's over-eager AutoCorrect features by exposing options normally buried under the Tools, AutoCorrect menu. Start a bulleted list and a Smart Tag permits you to undo the bullet or stop creating bullets. They also jump in when an email or Web site address is turned into a hyperlink, when a few dashes becomes a line running across the page, or when the date 3/4 is turned into a ¾ symbol.

Behind the numbers

The suite has been christened Office XP, but the individual applications retain Microsoft's conventional year-based tags of Word 2002, Outlook 2002 and so on. However, there are signs that the entire suite was originally going to carry that same number — numerous help files in the Office Resource Kit refer to "Office 2002".

If this sounds confusing, at least there's some sense in the specific version numbers for the applications. Word 2002 is officially known as Word 10.2627.2625. The 10 indicates the official version number of Word (in the same way that Word 2000 was in fact Word 9, Word 97 was Word 8 and so on). The next four digits indicate the version number of the WORD.EXE file, followed by the version number of the overlord MSO.DLL file. This should help ease the burden of support desk staffers wrestling with which actual version of any Office application you're running, because updates to the application or the entire suite (typically by way of Service Release patches) change the version number accordingly.



▲ Office XP provides an easy way to shift Office settings and customised files to another machine.

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There are obvious security issues with downloading Smart Tags and installing them on your system. Microsoft is at pains to describe the various measures it has in place, but there's no getting around the obvious and understandable concerns of people who have been stung by virus codes in WordBasic macro language and VBScript.

Another major change is the Task Panes. They are located on the right side of the screen, but they can be docked to the left. These frames list the most common options based on a particular menu selection or action. Choose File, then New in any application and the New Document pane appears. Options include creating a new document based on an existing one, and browsing your template collection.

However, there's much more to Task Panes. They pop up to guide you through the Mail Merge procedures in Word, and to help inspect and apply text formatting. In PowerPoint they provide a visual guide to the template designs and layouts. Across all applications, a Search pane makes it easy to hunt for Office documents locally or on a network. It also reveals what's stored on your multi-item Office Clipboard by showing snippets of text and thumbnails of images.

If you're running in 800 by 600 resolution, you'll probably find that the Task Panes take too much space away from the document you're working on.

This suite provided *APC* with a 'first'; we were pleased to have an Office application crash. We wanted to test the crash recovery feature touted as 'airbags for Office'. When we crashed, Office popped up a dialog box, graciously apologising for the error and offering to close and then restart the application. Not only did it do exactly that, but the Document Recovery Task Pane allowed us to re-open the document, complete with the last edits we'd performed, just as if it had been saved before the fatal moment.

Microsoft has made a lot of noise about retiring the animated paperclip, allegedly because Office XP is so easy to use. However, he and his friends are still hanging around; they're just turned off by default. They are replaced by a small box in the top-right corner of each application that serves the same purpose as the paper clip, the dog and the rest of the gang.

There are a few members of the expanded Office family missing from this roundup, due to their later arrival in the mix. Our copy of the final 'gold' code didn't include Publisher 2002, Microsoft's desktop publisher. This will appear in Office XP Professional Special Edition, and it will be available later on shop shelves in its own right.

Our earlier experiences with a beta of Publisher 2002 bode well for the finished product. One of the promising features is Font Schemes, which package together typeface sets that work well with each other. Publisher 2000's limited drawing tools are replaced by a full complement of Office art modules and a Word import wizard that retains the formatting and styles of the source document. There are also some long-overdue additions, such as the ability to open multiple documents, preview before printing and customise the toolbars.

So, how well does all this stack up? We'll hold back on passing judgement until we get our hands on the finished product.

Microsoft Project, which seems to be forever out of step with the rest of Office, is currently in beta 1 stage and not expected to ship until early 2002.

At the time of writing, Visio 2002 had just gone gold and was expected to be available when Office XP launches, but it won't be part of any Office package at this stage.

Flip through the following pages for a run-down on the individual Office applications and you'll get an idea of whether Office XP is for you. The verdict at *APC* is that Microsoft is on a winner, but standout features such as SharePoint and Smart Tags might not have enough broad appeal to convince people to part with their money.

Microsoft is holding a seies of Office XP roadshows, commencing in Canberra on June 5 and finishing in Sydney on June 21. For details, visit www.microsoft.com/australia/office.

Imaging

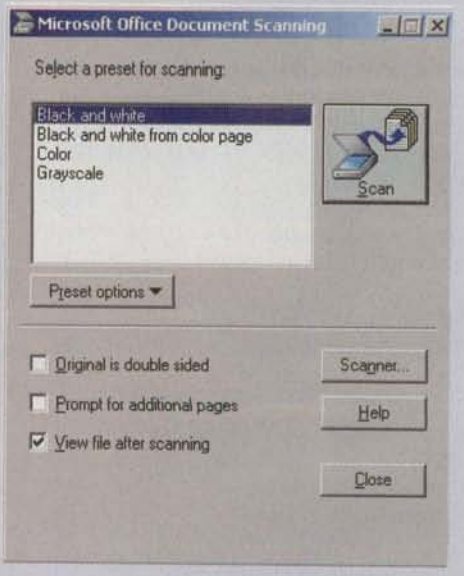
Office XP has taken a disappointing turn on the imaging front. While previous versions included the versatile PhotoDraw and the simple yet effective Photo Editor, the former is missing and the latter is the same product as it was two and a half years ago.

The best Microsoft can offer is a graphics utility called Office Document Imaging. On the whole, *APC* was less than impressed. This is a very simplistic tool, with the sole image manipulation capability being the rotation of a picture or scan 90° one way or the other.

Even with Photo Editor and Document Imaging, it's impossible to achieve PhotoDraw effects such as nicely blurred shadows and anti-aliased text. You can't really use Photo Editor to edit photos at all; at least, not on a pixel-by-pixel basis. When combined with PhotoDraw, it provided some useful capabilities in a supporting role, but it's not ready for the starring role that the ineffectual Document Imaging forces on it. Microsoft could and should have done a lot better than this.

Where Document Imaging does break some new ground in the Office suite is its OCR capability, which comes courtesy of OmniPage. Sadly, this is a very 'lite' version of OmniPage Pro and, as in most free versions, it is not capable of retaining text formatting and layout.

Given that this software already comes with a large number of scanners, Microsoft Office Document Imaging hasn't so much replaced one of the program's functions as removed it.



The only good news is that all the Office XP applications can compress images for more efficient display onscreen, on the Web and in print. However, while contrast, brightness and other simple image manipulations can be achieved in each application, this ability is also rather limited.

Microsoft Office Document Imaging has the appearance of an afterthought — and the performance to match. It would be far better if the OCR capability (and the separate Document Scanner utility) had been built into either PhotoDraw, Photo Editor, or both. Even some basic capabilities, such as reading or writing to any format other than TIFF, or being able to limit the OCR conversion to a portion of a document, would have improved our opinion. *APC* suggests you don't toss out PhotoDraw or your other imaging software just yet.

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Testing times — putting Office through its paces

With every release of Microsoft Office, there have been complaints about the speed of the applications, the major overheads applied to each file that increase that file's size, and the growing need for hard drive space on installation. The major complaints have been about the speed of processing large and complex files, and the startup times for individual applications.

APC tested the three major releases of Microsoft Office (97, 2000 and XP) with text files and spreadsheets. The software was tested on a system with a 933MHz Intel Pentium III processor, 128M of SDRAM and a 20G hard disk. For each installation of Office, the PC was reformatted and had Windows 98 SE freshly installed, including the latest drivers.

When tested, the Office TSR (terminate and stay resident) programs were closed. These included the Find Fast application, which indexes documents for faster loading, and the Microsoft Office application, which preloads some of the appropriate APIs into memory so that the applications launch faster.

Size does matter

Each installation for testing was the 'typical' installation content, as recommended by Microsoft's installation wizard. The hard drive space before and after installation was noted to check the installation size, and after the Office suite was uninstalled, it was noted again to see how much space was taken up with orphan directories and files.

As expected, Office 97 has the smallest installation size, but it still demanded a hefty 126M. Office 2000 took 188M, but Office XP is the real space hog, with a whopping 284M installation size — that's more than the basic Windows 98 operating system. To be fair, Office XP has much more integration with the Web, a lot of collaboration utilities, and many refinements to the programs, which have all helped to blow up the installation size. If you consider the average hard drive size of later machines, this isn't too much, but those with older systems might want to think twice.

Uninstalling Office suites often leaves behind many files and directories. Office 97 had the cleanest uninstall, leaving a little over 1M behind. Office 2000 and Office XP left 63M on the drive, which is quite a bit of space. This consisted of mainly temporary files, but also included updated system drivers and APIs.

Installation footprints

	Office 97	Office 2000	Office XP
Installation size	126M	188M	284M
Uninstallation leftovers	1M	63M	63M

Performance

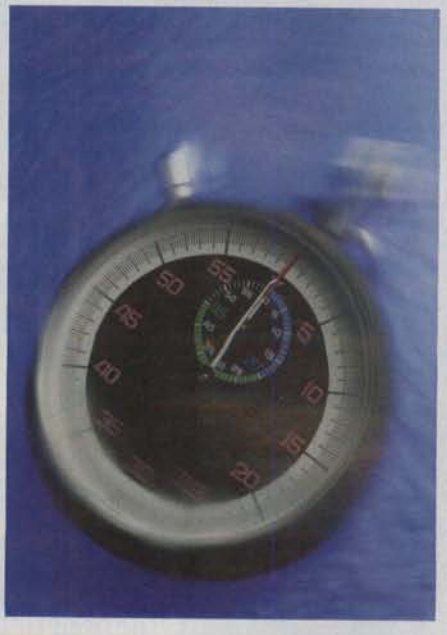
The base text file that the Excel spreadsheets and Word documents were created from was a 90M, 19,782-page, comma-delimited text file of all aircraft registered with the Federal Aviation Authority, listing names, registration numbers and aircraft parts. This is one of the larger and more manageable databases available for download on the Internet.

The Excel spreadsheet created from a quarter of this file was a huge 65,536 rows by 23 columns. The Word document was created from the comma-delimited text file version of this spreadsheet, which worked out to 3,597 pages. Both files were timed to see how long it would take to find and replace every single instance of the number 1 with a word. To give an indication of the processing power required, this meant a total of 874,833 individual replacements for each file. After each test, the system was rebooted to clear the cache of applications and memory.

With each successive release of Excel, the times for finding and replacing increased by mere seconds each time, but Word was a different story. It took Word 97 one minute and five seconds to make the replacements and Word 2000 just over one minute and 40 seconds. Word XP was the slowest by far. When the test reached 17 minutes, *APC* stopped it. Even at only a quarter of the size, the find and replace took over seven minutes, which is going to be unacceptable to businesses where such operations may be vital.

Decreasing the test size to a manageable 25 pages produced results faster than *APC* could click the start and stop buttons on the stop watch.

An advantage of Office XP is that opening times for large documents has been reduced to mere seconds.



Time trials in Excel and Word

	Office 97	Office 2000	Office XP
Excel find and replace (minutes:seconds:milliseconds)	4:32:13	4:35:5	4:39:99
Word find and replace (minutes:seconds:milliseconds)	1:05:00	1:41:64	Over 17 minutes
Excel opening time (seconds:milliseconds)	2:73	9:44	3:34
Word opening time (seconds:milliseconds)	3:12	3:59	3:42

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Word

Nowhere is Office XP more challenged than in Word; word processing hit its high point long ago. Word 2002 had to be able to make tasks it already performs even easier, and expose some of its non-core features to everyday users. Microsoft does seem to have hit the mark; it's the suite's best showcase for Smart Tags and Task Panes.

Pasting a slab of text into a Word document from a number of sources usually creates a hotchpotch of formatting styles. In Word 2002, a Smart Tag allows you to retain the formatting from the source document, make the new text match the formatting of the document into which it's been pasted, or keep only the text and ditch nontext elements. This can already be worked around by mapping a keystroke to the Edit menu's Paste Special command, but the new feature does make life easier.

A bevy of Task Panes also pitch in to make word processing easier. The Reveal Formatting pane provides a summary of all formatting in a document or selection. You can also compare the formatting of two sections, select all text with the same formatting, or apply identical formatting across multiple selections, all of which helps documents to look consistent. The Styles and Formatting Pane provides a library of styles in the current document for faster selection, as well as modification of styles.



▲ Crash recovery in action

APC appreciated the way the Document Recovery pane appeared when Word crashed midway through the writing of this article. Office saved the document at the moment of the crash, shut down and restarted Word, then allowed us to open the document and pick up exactly where the crash left us. The document was corrupted in the process, but Word cleaned it up and gave us the option of checking the repairs. It would be better if Word didn't crash at all, but a smart recovery routine is the next best thing.

Strongest of all are the team-savvy collaborative abilities. There is a new interface for document revisions, showing changes in the right margin, instead of imposing them inside the document. Red lines connect each markup comment to the original material. This makes it easier to read the original as well as the changes, and keeps the document's pagination intact. Edits and comments remain visible.

A separate Send for Review menu item allows documents to be distributed by email for group editing. At the end of the day, the document's owner can easily compare and manage revisions made by each person. In effect, this is collaboration without the server, and it recognises that email attachments are the predominant way people share documents.



▲ Options aplenty in the new Task Panes

Other appealing features include easier creation of watermarks, selection of discontinuous blocks of text, and the option to ditch Office 2000's habit of forcing each Word document into its own taskbar button. While this remains the default in Word 2002, you can opt to return to the single Word taskbar button. Windows XP provides a single button with a pop-up menu of active document windows — by far the most elegant solution.

It's an amazing oversight that the OCR capabilities of the Office Document Scanning tool can't be used from within Word. You can insert a scanned image, but not scan a document and have the text piped into a new document.

However, if you're part of a document-sharing group, or if you've ever lost half a day's work because Word chucked a wobbly, the relevant features of Word 2002 might be all the justification you need to step up to Office XP.

Office talk

Office XP is the first version of Microsoft Office to include voice recognition. It isn't part of the standard installation, so it needs to be selected when installing the suite. A good soundcard and headset (or microphone/speaker combination) are required to get speech recognition working. *APC* used a microphone headset in a very quiet environment. The microphone configuration wizard is the first thing to go through. It listens to you talk, then adjusts the volume and balance and sets the recording and playback level.

Like all voice recognition programs reviewed by *APC*, the software was trialled with the minimum training requirements (XP needs 15 minutes) and also after completing all of the voice training (roughly an hour). In the second trial, what was immediately noticeable was the very short time it took to parse the new voice patterns into an overall profile.

After the initial training session, a small animated tutorial showed you what can be done with the application and how to perform the most common tasks. These include standard dictation, voice commands such as opening directories and saving files, and navigation. At all stages, Microsoft insists that speech recognition should be used in conjunction with the keyboard and mouse, and *APC* agrees — no speech recognition program currently available allows for true hands-free operation.

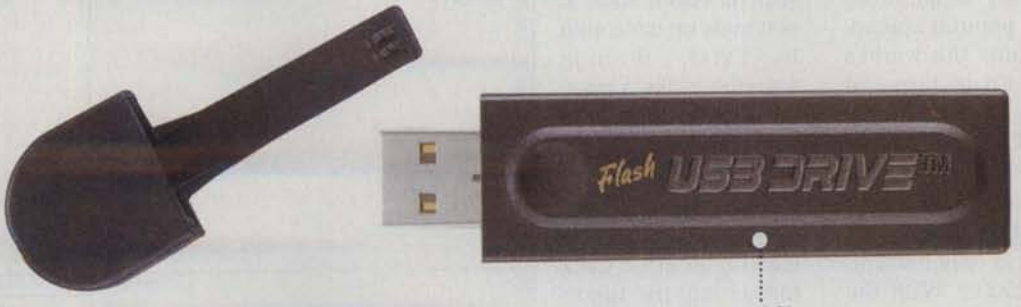
A speech toolbar floats across the top of the application, with the ability to turn the microphone on and off, toggle tasks and switch users. The speech engine can also parse existing documents to further learn your speech style — and this is the crux of all speech recognition. It must learn your style of speech and your vocal patterns over time, because speech recognition is mainly a guessing game. The engine guesses the word you just said, looks ahead and back at the other words surrounding it, and makes an intuitive leap to come up with chunks of sentence. Often, it gets this wrong, but over time the mistakes lessen.

The speech engine in Office XP is extremely easy to use, from the initial training session to the layout of the taskbar, but its error rates are a little higher than *APC* had expected after a few hours of training.

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Operating Current	<40mA
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Data Reading Speed	800Kbytes / sec (depending on PC system)
Data Writing Speed	500Kbytes / sec (depending on PC system)
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Relative Humidity under Storage	5% - 95%
Dimension	54mm x 20mm x 10mm
Operating Temperature	0°C - 45°C
Weight	15g (approx)
EMI Compliance	FCC, CE, EMI, EMS
Power Supply	USB bus-powered (4.5V - 5.5V)

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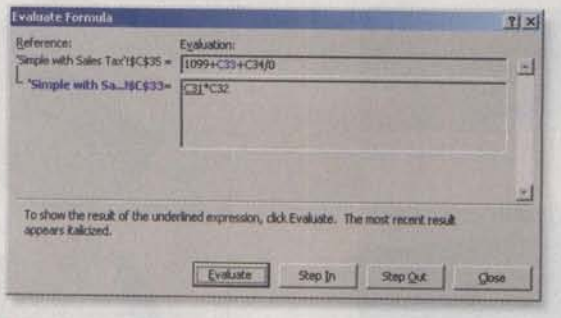
Excel

For many people, Excel is Microsoft Office's star application.

Through the 1990s, Excel climbed the same apparently unstoppable popularity curve as Word, eventually supplanting Lotus 1-2-3 as the most popular spreadsheet program. It remains the world's leading spreadsheet, both in terms of sales and what it can do.

As with the rest of this Office update, the improvements to Excel have concentrated on simplification and collaboration, but with some curious additions.

Excel 2002's interface is only marginally different to Excel 2000's. With the exception of the same overall lightening of the look and feel, common to all the XP applications, there are no immediately obvious differences. However, once you start using it, you notice several subtle but powerful improvements. Many of these hover unnoticed in the background, appearing only when needed.



▲ Evaluate the calculation step by step to find the error.

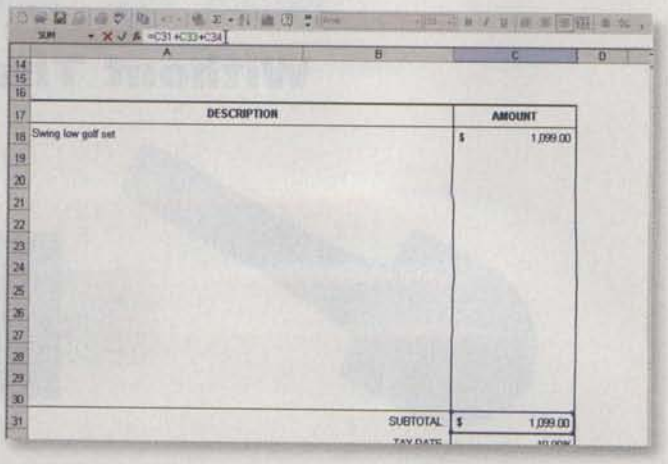
As with other XP applications, the New Workbook Task Pane has taken over from the previous New Workbook dialog box. It would have been better if the Task Pane extended to other purposes, such as building formulas, setting up watch lists and basic formatting. Word has a task pane for its Mail Merge wizard, and Excel should have a pane loaded with wizards that simplify goal seeking and data access. These can all be achieved through separate panels and dialog boxes, but the Task Pane is such a great idea that it's a shame the screen space it occupies isn't put to better use.

Where Excel literally excels is in its implementation of a set of four superb



▲ Excel can audibly confirm the contents of each cell.

tools that could, at first glance, have been borrowed from a development environment such as Visual Basic. If you mess up a formula in Excel, through something like a referential or zero-divide error, a small Smart Tag appears to the left of the offending cell, offering to identify and explain the error. Click further into the Tag to start the Formula Auditor. This graphically analyses the error by tracing the precedents and dependents of the calculation onscreen. From the Auditor, you can move through a step-by-step debugging process that shows exactly how Excel interprets each aspect of the calculation.



▲ Colour-coded highlighting makes it easy to track the elements of a formula.

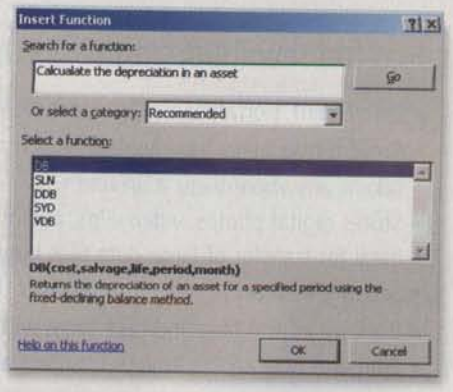
Along with the new Watch List (a small window that collects and tracks the values of targeted cells in either the current or other sheets or workbooks), this vastly simplifies spreadsheet debugging. While many programming innovations can leave you baffled, the Smart Tags, Formula Auditor, and Watch Lists are so well implemented that they provide almost no impediment.

What's the last of the four tools? Finish typing a formula identifier and you'll see a tool tip that identifies both the syntax of the remaining expression and each variable's expected value. This will save many a trip to the online help. It has long been a welcome component of Microsoft's programming suites, and *APC* found it a great timesaver.

People who are new to the program are also assisted by a simple innovation that dynamically highlights referenced cells as a formula is constructed. This is such an obvious and useful feature, it's a wonder it didn't appear years ago. Another good idea is the Function wizard's plain language entry system. Type in a description of what you'd like to accomplish and Excel will dutifully serve up the formula.

Excel's online data capabilities have also undergone a revolution. The new Data Connection wizard makes connecting to an external data source and maintaining a persistent connection as point-and-click as possible. Once you have connected to the source, an Office Data Connection File stores the relevant settings, making reconnecting from within another sheet or workbook essentially automatic.

AutoRepublish is also a great timesaver if you need to update published financial data frequently. Just open the spreadsheet, edit the data, and Excel saves the results to the site as you save the edited file. Excel 2002 can also save to and read XML, but it doesn't do so with the required XSL, so publishing as an HTML page remains the easiest way to send spreadsheets to the Web. Click the Interactive option and that page remains fully editable in Internet Explorer through Excel's Office Web Component.



▲ Describe your formula in plain language and it will be translated for you.

Excel 2002 provides a host of timesaving features that will lower frustration for new users and increase experienced people's productivity. The spreadsheet hasn't benefitted from all the innovations contained in the general Office XP interface, but it strikes out on its own in a number of innovative directions.

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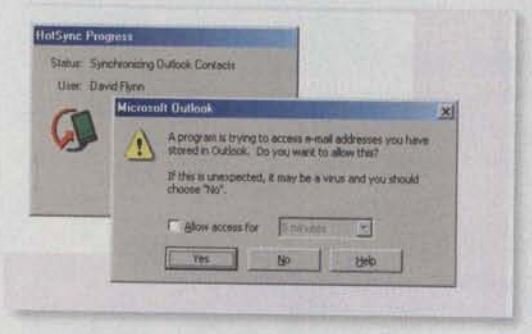
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Outlook

Outlook serves three key functions in the Office suite: as an email client, an information manager, and the hub of workgroup collaboration. Each role has been stepped up by degrees, and most people who use Outlook 2000 will find plenty to appreciate in the 2002 version. The only exception is a commendable but heavy-handed security system.

No-one is arguing with the intent; Outlook 2002 blocks potentially virus-laden files from getting to your hard drive. VBScript applets protect the system from infections such as the Anna Kournikova bug. However, dozens of other file formats such as URLs, EXE files, Access MDB databases and even screensaver modules also get spiked (ZIP and other archive formats get through).

You still receive the parent email, but with a warning that 'Outlook blocked access to the following potentially unsafe attachment'. A similar warning appears when you send an attachment that's considered suspect.



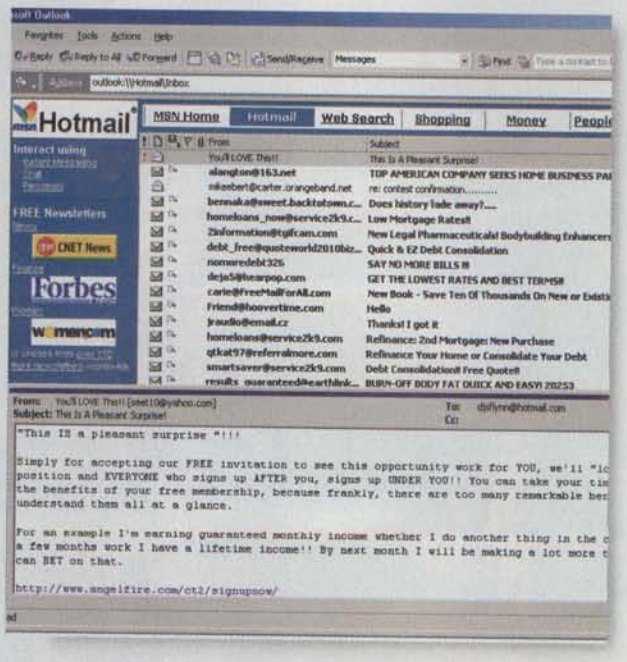
▲ This warning dialog can become annoying when it pops up very time you HotSync your Palm.

This is where Outlook goes overboard. Rather than diverting the suspect item into a quarantine folder emblazoned with suitable warnings, where the attachment could still be accessed, Outlook refuses to download it. There's no way to get at the file, because it's just not there.

System administrators running Exchange Server can modify Outlook's stringent set of files, but those using Outlook for standalone email and information management must resort to registry editing. The other option is to download a nifty COM (component object module) by Outlook coder Ken Slovak, which allows you to tailor the file types filter from an Attachment Security Options page in Outlook's Tools, Options menu (get the file from www.slipstick.com/files/attopt.zip). Outlook 2002 needs to work harder on striking a balance between protecting and hindering.

A second layer of protection against Melissa-like attacks alerts you when a program attempts to read Outlook's address book or send email. You can refuse this access or permit it for a period of up to 15 minutes. This is nice in theory, but having to deal with this window every time you synchronise your handheld with Outlook is annoying.

Microsoft has said that in a successive version of Outlook, it intends to implement recognition for 'trusted applications', which will allow programs like Palm's HotSync to run without interruption. *APC* hopes it happens soon.



▲ Outlook now has access to Web-based http mail servers such as Hotmail.

Most of Outlook's other email-centric tweaks are pleasing. Setup runs like a charm, with the elimination of the confusing Internet Only and Corporate Workgroup installation modes.

Novices will find it easier to configure and manage email accounts, and those with several accounts can choose which one a message is sent through. The Word-based email editor is enabled by default, and although it is faster than previous versions and provides full access to all Outlook options, this is still the first setting to disable if you're running with less than 64M of RAM.

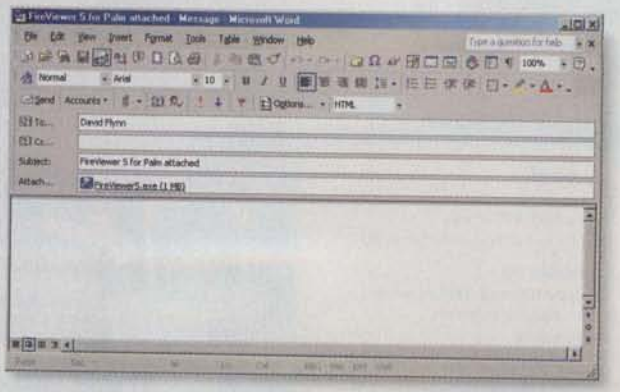
Features that have been in Outlook Express for years, such as automatic completion of email addresses and access to Web-based http mail servers such as Hotmail, finally make their way to the standard Outlook.

It also has the ability to reformat emails created in plain text, remove uneven line breaks, and you can now accept, decline and propose new times for meetings directly in the preview pane.

On the calendar side, the cascade of reminder windows is replaced by a single window listing all current reminders. You can open or close them individually or dismiss them all with a single click.

Your free and busy periods can be published to the intranet or to a Microsoft-hosted Web server (another Passport-driven part of the .NET vision), where other people using Outlook 2002 you've granted viewing rights to can check your availability and schedule meetings accordingly.

You can manually apply colour coding to calendar events and edit the categories to suit your liking. However, to tap into automatic formatting, you'll have to wrestle with Microsoft's overly complex implementation of colours invoked as rules and attached to specific views.



▲ Watch what files you send, as Outlook blocks many formats.

From a workgroup perspective, the improvements include the ability to cancel server requests and long sync sessions when you're on the road and dialling back into the server, and the proposal of new meeting times if the ones suggested don't work for you.

black magic



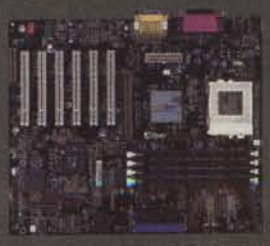
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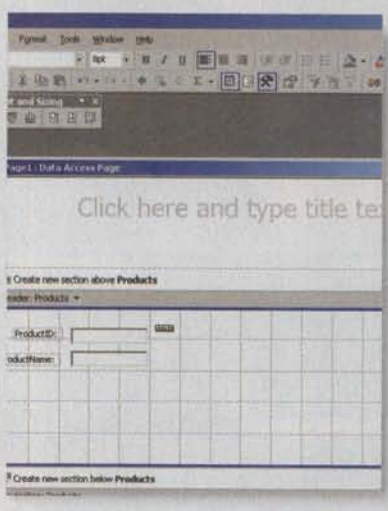
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Access

Any database that takes you beyond the basic flat-file level of FileMaker Pro will present a rather daunting learning curve, and Microsoft Access is no exception. You'll need to take a deep breath and commit before you can take advantage of its more advanced features.



▲ Linking a database to an external source has never been easier.

Access 2002 comes with a range of templates identical to those supplied with the last two versions, and they continue Microsoft's fine tradition of offering next to no assistance to novices beyond setting up the initial database.

For example, it's easy to produce a contact manager in a matter of minutes, but anyone who wants to customise the results further to suit their specific needs is left very much on their own.

That gripe out of the way, the new Access greatly simplifies the previously complex task of building front ends on to online databases. *APC* found the Data Access Page Designer very easy to use, turning front-end construction into a point-and-click exercise. It's as easy as following the wizard to set up a link (including stored links previously created through Excel), and dropping the fields on to the page.

If you need to extract data from more than one external database, use the new Linked Table wizard. It can work with any combination of Access, dBase, Paradox, Excel, delimited text or HTML, but this requires a local SQL Server. You should also check out the Stored Procedure Designer. It's the easiest method of modifying simple SQL Server routines without delving into the actual language that *APC* has seen. There's a lot of intelligence built into all of these tools, which can only be seen as a saving grace. If you hook up to Microsoft SQL Server 2002, you can also take advantage of the new extended field properties to make an SQL front end as predictable and versatile as a regular Jet database.

Perhaps the biggest news for many developers is the new XML support. Access 2002 can publish any report, table, query or form to XML, along with the associated XSL (extensible stylesheet language) presentation file for display as a Web page, and it looks as good online as it does on your Access page at the office. Access can also import XSD (XML schema definition) from the Web and automatically create parts of or an entire relational database. The application has also retained full support for publishing to HTML with CSS (cascading stylesheet) formatting.

These features, along with the PivotTables and PivotCharts, a more advanced but optional file format, multiple undo/redo, and overall tweaked forms, designers and shortcut keys, make Access 2002 a solid if incremental step in the evolution of an industry-standard database.

SharePoint

The newest member of the Office family is SharePoint, which provides a Web-based collaboration environment accessible to any member of a workgroup with Office XP.

SharePoint (its full name is SharePoint Team Services) is available in the Professional Special Edition and Developer Edition of Office XP. It allows you to establish a Web site where your team can share documents, post announcements, access shared contact lists and discuss topics through an online message board.

You can host a SharePoint site on an internal server running on Microsoft's Windows 2000, or on an ISP that supports the service, and restrict access to specific people. ISPs are likely to charge for hosting SharePoint sites.

APC set up a test SharePoint site through WebCentral (www.webcentral.com.au). At the time of writing, Office XP had yet to be officially released, and WebCentral had not announced its own pricing plans for SharePoint hosting.

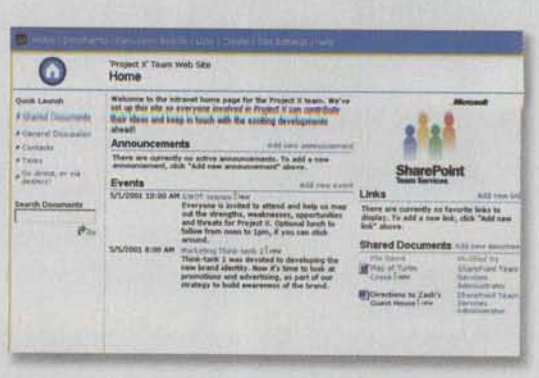
The tight fit with Office applications made working with the SharePoint site almost seamless.

APC was able to save documents from Word 2002 and other Office XP applications directly to the SharePoint site's document library, as well as work with other basic ingredients such as task lists, site links and event calendars (although the date can't be changed from the default US month/day format).

Site administrators can create surveys with a range of canned responses and export the results to Excel, as well as create their own custom lists. You can export items from Outlook's address book to a SharePoint contact database, but there's no easy way to bring contacts from the site into Outlook.

APC found it exceptionally easy to customise the site, but it falls short of making changes to SharePoint's basic format. The framework is cleanly designed and easy to navigate, but if you want to take it further, you'll need to fire up FrontPage 2002, which comes with a SharePoint Team Web site template.

Microsoft will unveil SharePoint Portal Server, which is a corporate companion to Team Services, simultaneously with the launch of Office XP.



▲ SharePoint is another collaborative tool in Office XP.

Team Services sites are intended to be smaller, ad hoc efforts, with perhaps a lifespan limited to the duration of the project, but the Portal Server is aimed at an application space (another iteration of the .NET framework) to connect any number of corporate TeamPoint sites.

On the full release of SharePoint Portal Server, *APC* will be curious to see just how close SharePoint can get to matching collaboration champ Lotus Notes.

FrontPage

FrontPage is a powerful tool, but it may not work to its full potential in inexperienced hands. This new version won't turn anyone into a savvy designer instantly, but it does provide a host of features that will help new users achieve respectable results.

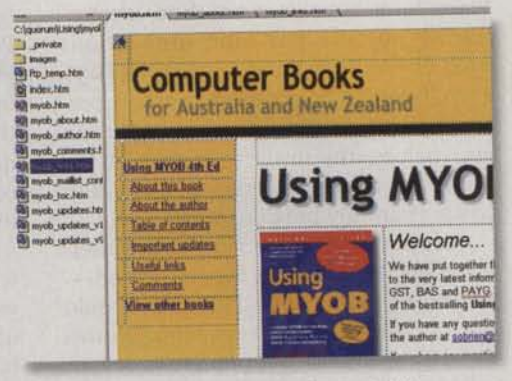
Microsoft has done some subtle tweaking; for example, the Navigation view now displays in the Folder List pane, rather than the main window. It has also added some useful drop-in components.

The addition of tabs across the top of the main design pane makes it easy to jump between multiple loaded pages. The software still allows Normal, HTML and Preview displays of the same page, and Reveal Tags and colour-coded HTML highlighting remain. One small addition is a new HTML toolbar that allows one-click selection of a specific HTML-demarcated portion of a page, such as the current column or table.

The Task Pane plays an even smaller role in FrontPage than in the other Office XP applications. It's limited to a templates page, a search page and a clipboard page.

FrontPage is still aimed at non-professionals, but through a significant expansion of the Web components tools, it can help improve the appearance of any site. Web components were once greatly overused just for special effects, but the new components are actually useful.

Setting up an ecommerce site takes only moments with Microsoft's bCentral. Add the ecommerce Web component to your site to build a catalogue of items and enable your shopping cart. It sounds easy, but Australian businesses face subscription costs of about $50 per month, and automatic credit card payment processing isn't available unless you have a US bank account and address. Many Australian banks have partnership arrangements with US banks that can satisfy both those requirements. However, you can't link the bCentral product pages to an Access product database, for example, and if you look at the bCentral sites, you won't see any really impressive ecommerce-enabled businesses.



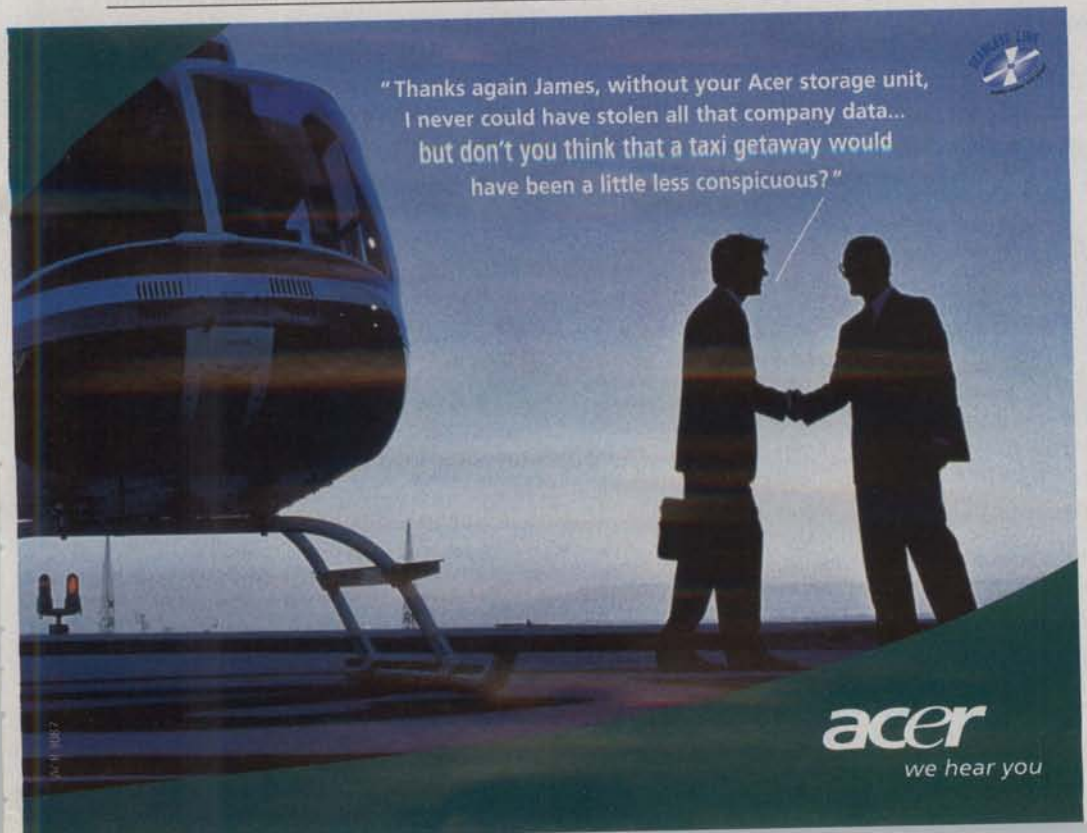
▲ The FrontPage Task Pane is not such a useful change.

New Web components include the ability to display the latest news headlines from MSNBC, and add stock quotes (but not ASX) to your page. These are great, but they are US-centric. The top 10 lists are of more use. These will give you statistics on who has visited your site, and there is an invisible hit counter. The List and Document Library components are used with SharePoint Portal to add workgroup features to a site.

This new version confirms FrontPage as the best way of putting Office on the Web. The interface is familiar to anyone who has used the other Office applications, but its support for SharePoint makes it easy to customise SharePoint Team Services sites.

FrontPage makes it possible to build lively, evolving sites. It took just a few minutes to use the new Photo Gallery Web component to build an online image catalogue and slideshow. The page formats all have professional gloss, and the thumbnail generation produced clear, but highly compressed, files in seconds.

The Photo Gallery probably shows the future of FrontPage best. It automates many of the difficult aspects of Web design, so clean, fast-loading pages with a number of advanced features can be published, managed and updated easily. Unfortunately, many of the 'new' features in this latest FrontPage are simply integrated portals to other Microsoft-owned subscription services. However, if you'd like to set up online shopping on a budget, or need to integrate your workgroup with a SharePoint server, FrontPage 2002 is definitely the way to do it.





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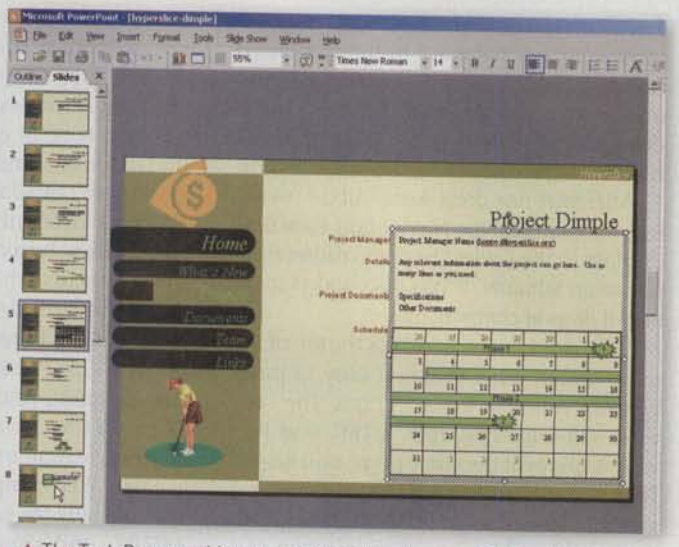
PowerPoint

PowerPoint benefits more than most of the XP applications from innovations such as the Task Pane and Smart Tags. Even though it boasts more complex presentation features and transitions than ever before, the intuitive nature of the Task Pane makes PowerPoint 2002 easier to use than any previous version.

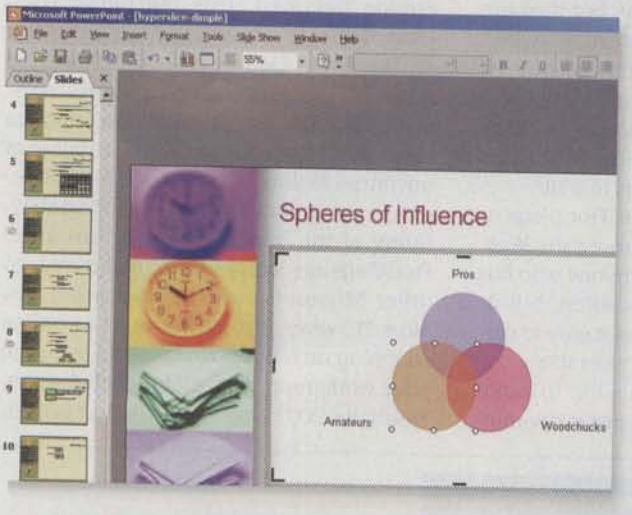
Some of the best new features in PowerPoint stay hidden until they're needed — something that any good interface should do. For example, insert a new object into an existing slide and the automatic layout adjuster will ensure it fits in neatly beside any existing objects according to the master layout. Unhappy with the new position? Just click the Smart Tag to shift it back.

The new OrgChart, is common to all the Office XP applications, but it is probably made more use of in PowerPoint than anywhere else. Its new inplace editing makes this task easier and quicker, and it's also easy to apply 3D effects to each element.

Animation schemes will also come as a welcome surprise to all those people who have been bewildered by PowerPoint's vast array of special effects. You can now choose from any of the 32 schemes to apply a range of preset effects to each slide's transition immediately, and its title and detail areas. Each animation scheme, design template and colour sche-me occupies the same Task Pane, and their slick combination made it possible for *APC* to customise every aspect of an entire presentation with just a few mouse-clicks.



▲ The Task Pane provides a handy repository for new slide designs.



▲ Transparency effects, a new OrgChart tool and multiple masters can give presentations a stunning new look.

PowerPoint 2002 presentations now support multiple master slides, making it possible to combine several presentations in one file or make a single presentation in sections. *APC* is pleased to note that PowerPoint finally provides a print preview function, and other simple utilities such as image rotation, an alignment grid and a revisioning system similar to Word's. If you have two monitors attached to your computer, the presentation preview appears on the second screen, and you can still work on it on the first.

PowerPoint's lack of user-defined formatting styles is still rather frustrating. In the next version, Microsoft should expose the style sheets used in their own master styles. Also, *APC* found it easy to publish a presentation to a series of Web pages, but those pages couldn't be edited in FrontPage without being corrupted to the point of illegibility.

Office for rent . . .

Most Office buyers traditionally upgrade from previous versions of the suite, but Microsoft is also hoping to attract many first-time shoppers with Office XP — primarily, home users who bought their first PC in the last year and have since been comfortably pottering along with a bundled version of Works. However, how do you get someone in this notoriously price-sensitive market to pay upwards of $1,000, perhaps half the cost of their entire PC system, for a piece of software?

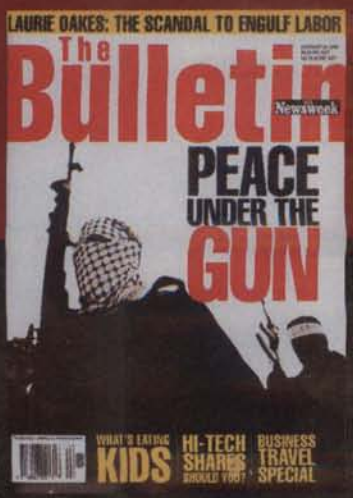
You don't — but you can tempt them with a much lower annual fee that covers a single year's use of the program, with the option to renew at the same price every 12 months. That's the theory behind the Office XP subscription program, which will kick off at $299 (officially $359, but with a $60 rebate).

Buyers start by choosing the 'subscription edition' of Office XP Professional, which will sit on the shelves of software retailers next to the upgrade and full versions. Once the mandatory activation routine is complete, this copy of Office XP will be time-locked to run for 12 months from the date of installation.

At the start of the 11th month, you are notified that your subscription is due for renewal. If you fail to renew your licence after 30 days, the program reverts to a nonediting application — you can only open, view and print documents.

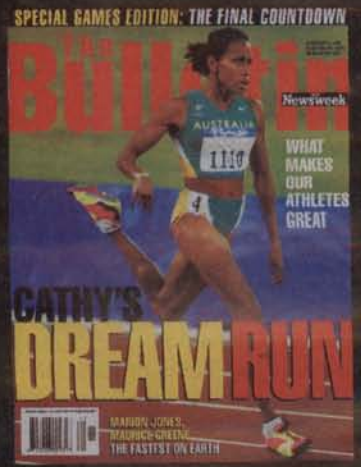
You can renew your subscription through Microsoft Australia's Web site or on the phone. A new activation code is then issued to cover the following 12 months. You can also buy another copy of the subscription edition across the counter at most software stores.

The annual subscription covers all updates to Office during that period. If Microsoft releases an Office XP 2 two years down the track, an upgrade will be issued for free to all current Office XP subscribers.









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The stress test

There is only one way to measure an application's usability properly, and that is to put it through its paces in a real-world stress test. *APC* took Office XP and put each part of the suite through a series of demanding procedures. Our test machine was a typical business computer: a Pentium III 450MHz with 128M of RAM, running Windows 2000 Professional. We used network storage for documents and installed Office XP over the top of Office 2000.

The results were good, but curiously, the XP application icons failed to appear. We had to go searching for them in the Program Files folder.

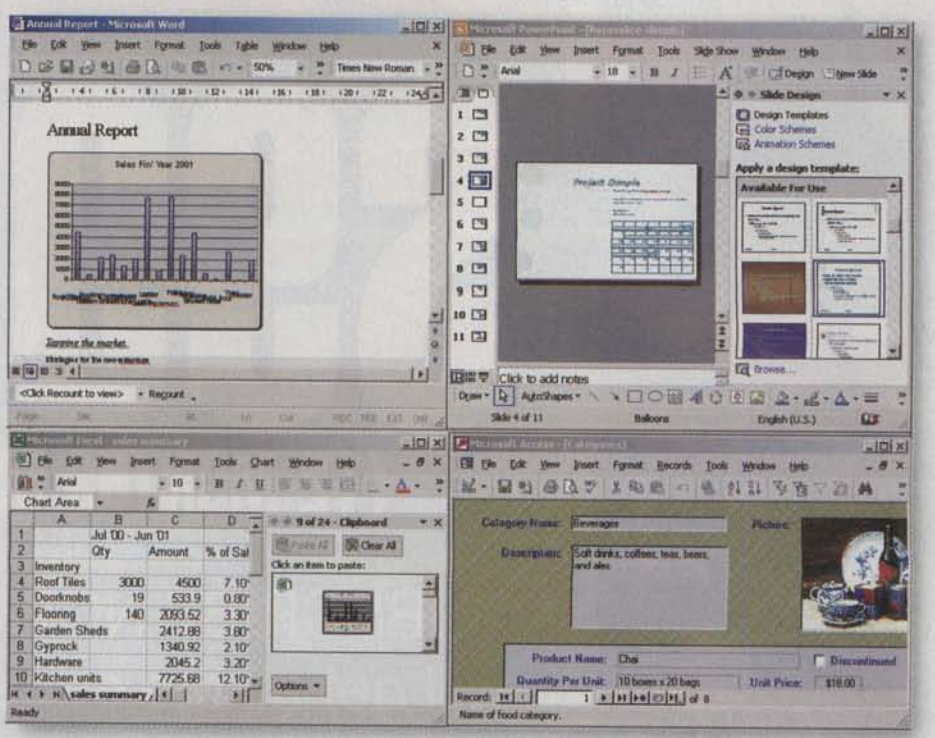
The test was based on a typical business task: extract the relevant figures from a sales database, filter them in Excel, and publish the results by intranet and email, always using the best Office tools for the job.

We started in Access with a large text file exported from an accounting package. This was reduced to category-level data, printed to a standard CSV (comma-separated values) file, and reopened in Excel, which can convert CSV files without going through a separate import process. In most cases almost no tweaking was required.

Creating a graph of the sales data was easy — just follow the wizard. However, shifting that graph around caused us the first problem.

An Office Chart is one of those objects that can be used in almost any of the Office applications, just like clipart. However, it doesn't all work quite as expected. For example, we set up the chart with vertically aligned, y-axis labels. (They run along the bottom of the chart and denote each column.)

Copying and pasting the chart into Word 2002 worked just fine, but when we chose to edit the chart, Word immediately converted all the labels to an illegible horizontal format. The answer is to use Word's new pasting Smart Tag to set up a link to the original chart or embed the actual workbook in the Word document. Embedding was the default behaviour in Word 2000, but this has been changed in Word 2002 so that pasting a chart only pastes the graphical elements that make up the picture of the chart, rather than the actual chart object.



▲ Even an entry-level business system can handle running Office XP applications concurrently.

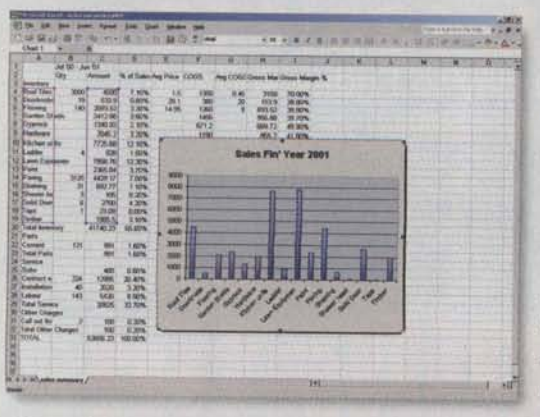
Pasting a chart as a picture rather than an embedded object results in a smaller (and possibly more portable) file. However, you can also choose to store the chart as an embedded worksheet, and continue to use inplace editing through the Excel application server. This is how it worked in previous versions of Office, and it still works best in Word.

In another annoying inconsistency, PowerPoint 2002 chose to embed the entire worksheet by default (it doesn't provide an option to link to the original file), while FrontPage converted the chart to the picture format and left it like that. This is, admittedly, a step up from the previous FrontPage, which couldn't directly import Excel charts.

Once we worked out all the combinations, it was quite easy to complete a report and presentation, and despite our experience with the chart, one of the great timesavers of XP is that data is very portable, just using copy and paste. In all the applications, a Smart Tag pops up immediately after you paste something. Depending on the type of data and the application, this allows you to keep text formatted, remove formatting, embed the object or save it as a link, apply old styles, and so on. It's an intuitive process, and it saves a lot of repetitive reworking.

In a matter of minutes, we were able to prepare a report in Word and save it to HTML with its own CSS (cascading style sheet), ready for final tweaking in FrontPage. Slides from a PowerPoint presentation were added just as easily, but it's even neater to save the presentation for the Web and allow the slide show components to handle presenting that information.

Throughout our test, importing data was simple and intuitive, and it didn't require a single trip to the Paste Special menu. There hasn't been anything like this since ClarisWorks, and while most of it was possible in Office 97 and 2000, it has never been easier. Office XP is a truly integrated and stable suite; our tests didn't manage to crash a single application, and even with just 128M of RAM, there was no thrashing of the virtual memory. Based on this test, Office XP looks like the best Office yet.



▲ From almost any starting point, Office XP can work with and share data.

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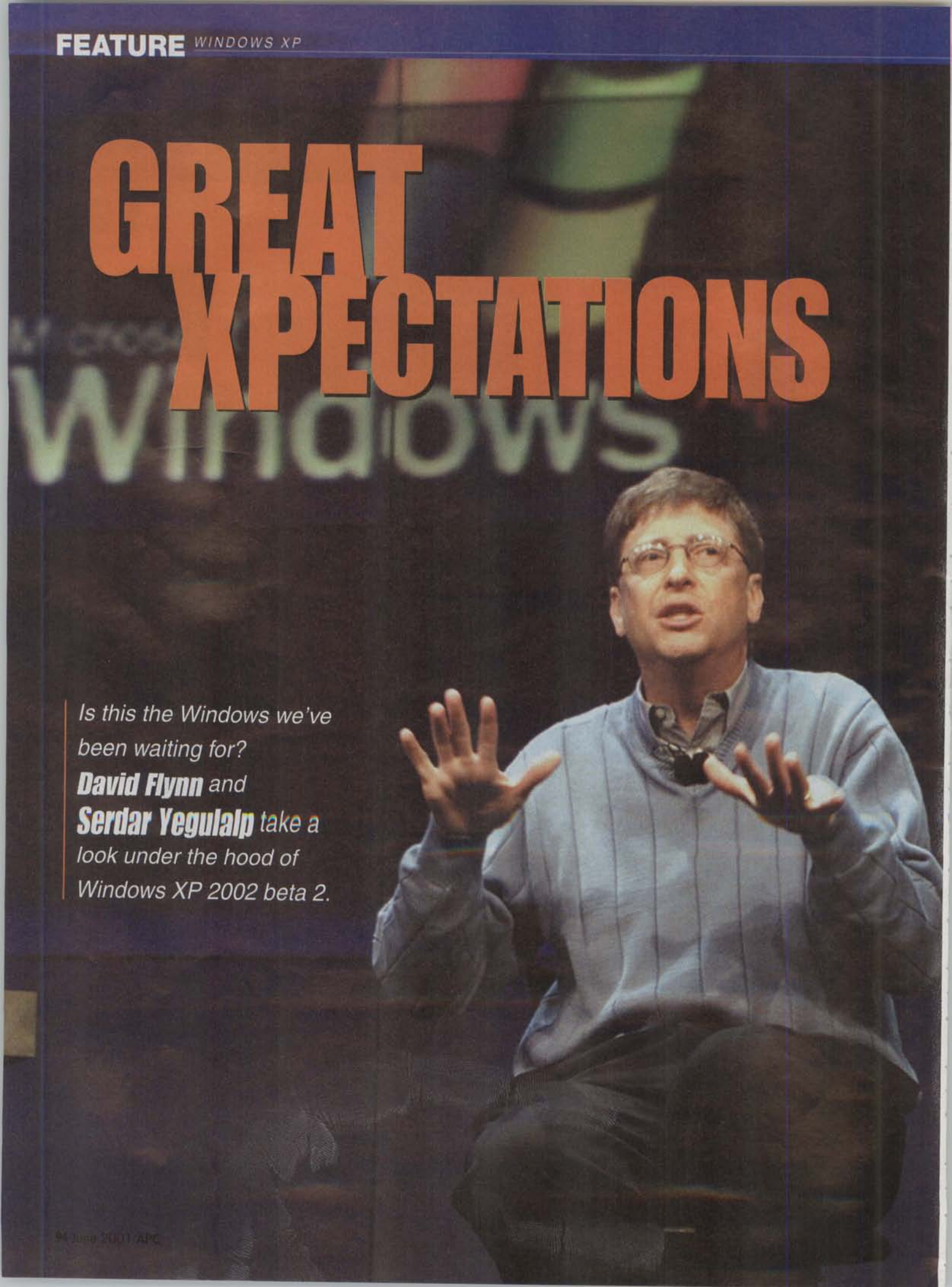
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GREAT XPECTATIONS



Is this the Windows we've been waiting for? **David Flynn** *and* **Serdar Yegulalp** *take a look under the hood of Windows XP 2002 beta 2.*

Let's make one thing clear to start with: XP is perhaps the most important version of Windows since the first roughhewn beta of Windows 95 emerged from the Redmond headquarters. It's certainly the most polished and the most robust. Moreover, it's probably the most *fun* to work with.

When it arrives later this year — *APC* is predicting early November — Windows XP 2002 will replace the 95/98 and Me line for home and small business users, and the Windows NT and 2000 line for corporate users.

Windows XP inherits the best traits of both parents. Windows 2000 provides a rock-solid code base designed for performance, stability and security. Windows 95/98 contributes its friendliness (including system health features introduced in Me) and a broad base of software and hardware support. XP has built on these foundations, adding major and minor improvements.

Here's what *APC* likes most about Windows XP.

- **Stability** XP is far more stable than the 95 and 98 versions of Windows, thanks to the 2000 kernel. Even on a completely clean machine, 95 and 98 grow sluggish and crashes constantly during a day's solid activity. XP doesn't even struggle when juggling multiple programs, and it recovers gracefully from catastrophes such as power outages and accidental file deletions that would leave 95 and 98 flat on their backs.
- **Speed** The shift to Windows 2000's 32-bit architecture also gives XP an edge over its predecessors in terms of speed, even when it comes to startup and shutdown time. The newer your system, the better the results, but even on a relatively old or inexpensive machine, the improvements are obvious.
- **Application compatibility** Microsoft knows this was the Achilles heel of Windows 2000, so it has worked to ensure that XP is far more flexible than 2000 when it comes to dealing with older software and hardware. If it runs on Windows Me, chances are that it will run on XP.
- **Interface** After six years of the original 'Chicago' shell, Windows has been given a dramatic makeover. It's more than just the slick new look; the operating system has been redesigned to work with you instead of against you. After a few weeks on Windows XP, returning to 95, 98 or 2000 is a huge step backwards.

16-bit code gets the bullet

The most significant thing about XP is that it represents the end of the line for 16-bit code in Windows. That's been Microsoft's goal for several years — it once even announced that Windows 98 would be the last of the 16-bit breed. This was a bit premature, but the day is finally here. From XP on, the Windows operating system is 32-bit from top to toe.

To be fair, the 16-bit chassis was necessary for Windows 95. Many applications and device drivers were still 16-bit, so the operating system had to make some compromises so that the transition to 32-bit would be smooth.

The proportion of 16-bit code has decreased with each successive version, but there's still been enough to make life difficult. You don't need to look hard to find people who've been let down by the flaky, unstable and downright recalcitrant Windows 98, and even Windows Me.

Windows NT allowed Microsoft to banish all traces of 16-bit code. As XP is built on the same 32-bit NT framework, it gets the same fresh start that NT enjoyed.

Nothing in XP runs natively or in DOS mode. Each application and driver is launched in an isolated memory space so that it can't bring down other programs if it crashes. The result: no more rebooting four times a day.

XP is able to run 16-bit programs, such as games, with maximum compatibility by pretending it's an earlier version of Windows. A command-line rescue mode allows you to boot the system with a minimal driver set to perform repair operations, and you can still launch a conventional command line to type DOS instructions. However, the underlying 16-bit DOS legacy architecture is gone forever — and good riddance to it.

APC worked with XP beta 2 for several weeks and didn't encounter a single 'blue screen of death'. Recovering from an accidental power outage was as simple as turning the computer back on. XP is infinitely more stable and more efficient in its operation than any previous consumer version of Windows. Betas are usually uneven, so this bodes well for the finished product.

Application compatibility

Stability is the greatest benefit 95/98 users will get from Windows XP, but for the NT and 2000 crowd, the big gain is compatibility with legacy applications below 32-bit. Windows 2000 isn't compatible with many popular games and education titles and has suffered for it, so this is a necessary advance if Windows XP is to become popular with home users.

Hardware isn't a big issue. Hardware manufacturers have had plenty of time to write and distribute drivers for Windows 2000, and these work in Windows XP as well.

Not every PC will enjoy a faultless upgrade. It's not possible for Microsoft to test every peripheral and every permutation, but as the market moves towards new PCs, these problems will diminish.

The real challenge lies with software, primarily with the way applications react to the operating system. If a game looks at XP and sees the underlying NT code rather than the Windows 95/98 platform for which it was written, it won't install.

Microsoft has worked around this by including a new AppFixes program which contains a database of all programs known to be problematic for NT. If a game asks XP whether it is Windows 98, it fibs and says 'Yes, I am' and then makes good by creating the 98-style registry and system folders the game expects to see. XP can mimic Windows 95/98, NT and 2000, and it's easy to add your own golden oldies to the database.

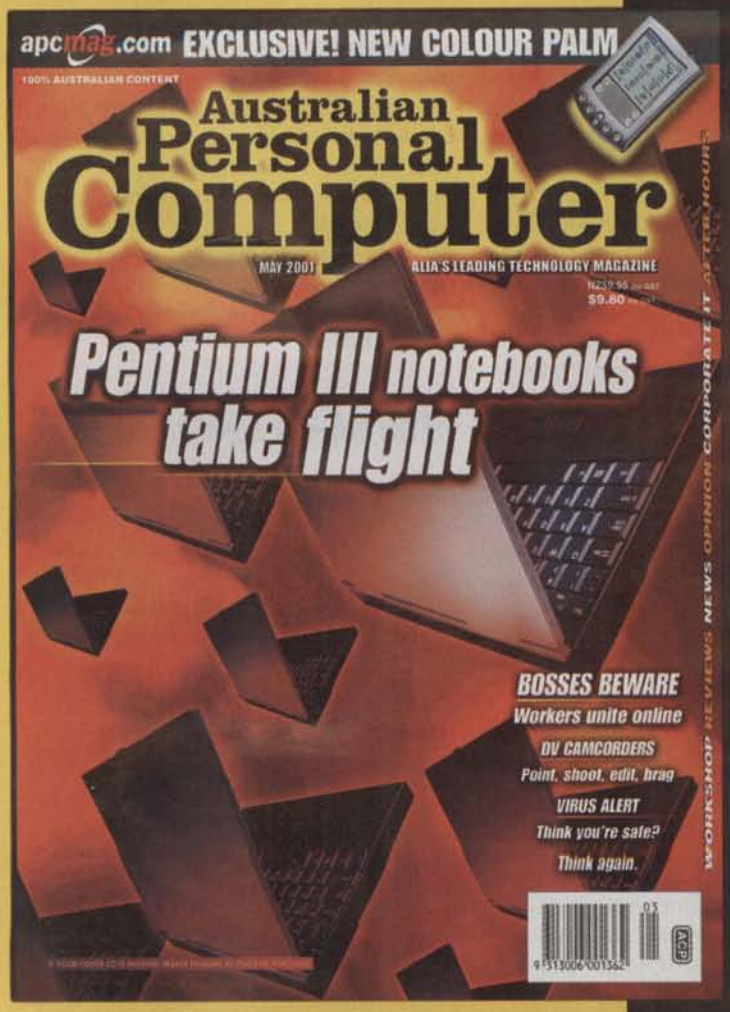
The 64-bit question

From the earliest days of DOS, PC users have been slowly harnessing the power of the CPU. The earliest computers made do with 8 bits. The shift to more complex applications and graphical interfaces required 16-bit, and more recently 32-bit, computing. The next stop is 64-bit computing. This promises even greater power, mainly for servers and high-end workstations. Microsoft is developing a 64-bit code base for Windows XP, possibly called XP/64, which will be supplied with Professional and Server versions.

Intel and AMD are preparing 64-bit processors now. Intel is developing its Itanium so it will eventually replace the 32-bit Pentium chipset, and has already supplied Microsoft with sample silicon on which 64-bit versions of Windows 2000 are running. *APC* has seen it — outwardly it looks the same, but there are substantial differences beneath the surface.

AMD isn't procrastinating either, and the plans for its Sledgehammer 64-bit chipset look promising. The make-or-break factor for AMD isn't whether it will ship on time, or even whether its product can outrun Itanium, but whether or not Windows will run on the AMD architecture. A totally native version of Windows is needed for the Sledgehammer to make it worthwhile. It's not known whether Microsoft is considering this option.

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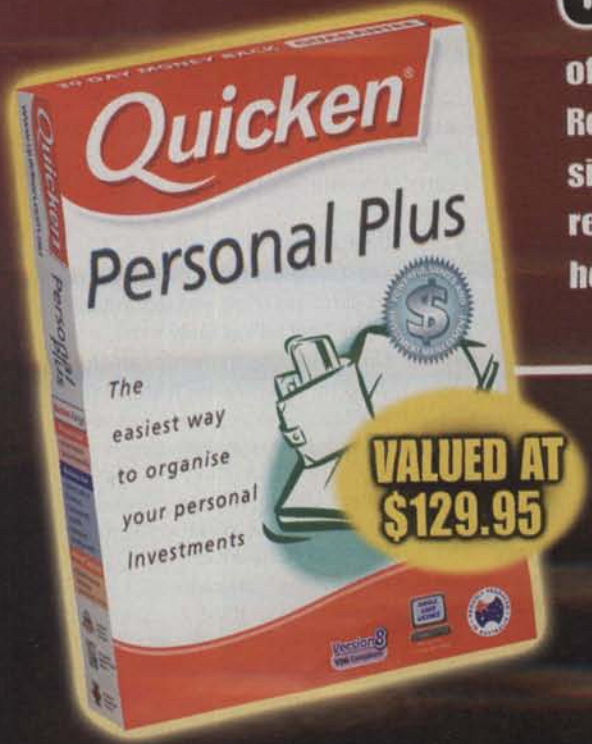
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Product activation

Most of XP draws appreciative oohs and aahs, but there's one part that's generating rumblings of discontent. This is Microsoft's controversial Product Activation (PA) anti-piracy technology, introduced in Office 2000, but also included in XP.

To date, a single copy of Windows could be loaded on to any number of PCs provided you had the 'alphabet soup' product key (which could be stuck on to the CD case, printed on the certificate of authenticity, passed on by a friend or copied down from a warez Web site or newsgroup).

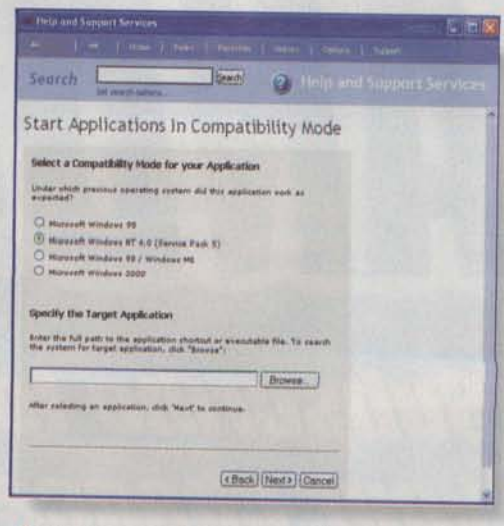
With XP, all that will change; now it's one copy of Windows per computer. If you run a desktop and a notebook, you'll need two copies of Windows. If you want to run a home network with a PC for each of the kids, it might be time to think about a volume licence!

PA benefits Microsoft and disadvantages casual piracy, and it's going to annoy a lot of legitimate customers in the process. Here's how it works: during the installation process, Windows XP polls 10 separate components in your PC, such as the hard drive, video card and network card, to obtain their individual serial numbers. These numbers, and the product key of your Windows XP disc, are combined in an algorithm to create an installation ID that's as unique as a fingerprint for your system.

Once the operating system is up and running, you have 30 days (15 days for the beta) to contact Microsoft by phone, fax, Web or email, provide your installation ID and receive a corresponding activation ID (derived from your installation ID and generated through a second algorithm).

If you enter that code, Windows becomes legitimate. However, if you exceed the grace period without doing so, you'll be prevented from logging on. If a crash of epic proportions requires a reformat of the hard drive and a reinstallation of XP, your original activation ID remains valid.

There's sufficient 'fudge factor' in the code to handle several new pieces of hardware — Microsoft representatives say you can change up to four components without problems. If you give your machine a more extensive overhaul or buy a totally new PC, you have to request a new ID.



▲ XP makes great strides in application compatability.

Windows' five flavours

Windows 2002 will begin shipping in two forms: Windows XP 2002 Home Edition and Windows XP 2002 Professional. Home Edition is aimed at home users, but it's also likely to be the first choice for many small businesses. There's nothing simplistic about it; it has the latest take on almost everything in Windows Me and Windows 2000.

XP Professional contains everything Home Edition has, as well as some enterprise-related extras for management and stronger security.



The features most likely to encourage people to move up from Home Edition to Professional are the backup and recovery utilities, the multimonitor support (included in Me and 2000, but restricted to XP Pro) and the 'take control' mode in Remote Assistance.

Next year, Microsoft will release the three server editions of Windows 2002, which drop the desktop brand of XP from their titles. These enterprise-tuned editions will be Windows 2002 Server, Advanced Server and Datacentre Server.

The hardware hit

Windows XP's major drawback (and one that might prevent people from quickly moving up to the new OS) is its hefty memory requirement. Our testing of the beta indicates that memory is more crucial to performance than processor speed.

As a rule of thumb, the performance of Windows XP should match Windows 2000. Microsoft's stated *minimum* memory requirement is 64M. This is barely enough to get you started; you'd have to forgo all of the cool effects and appealing features such as Fast User Switching if you ran XP on that little memory.

APC recommends at least 128M of RAM for anyone contemplating an XP upgrade, and power users should set their sights on 256M. Yes, that's a lot of memory, but at least it doesn't cost much. At the time of writing, the going rate for a 128M stick of SD-RAM was about $100.

Windows XP can handle as much RAM as you are willing to throw at it, and it really starts to soar when you pass the 128M mark. There are enough extra programs and tasks to make 256M a sensible target.

APC tested XP on a variety of machines, from a 333MHz Celeron to a 1.3GHz AMD Athlon, with RAM from 64M to 384M. The lower-end machines perform surprisingly well, but there were bottlenecks. These weren't due to the processor, but rather to the amount of available memory and the type of disk controller. Consequently, *APC's* recommended *minimum* system for XP is a 300MHz Pentium II, with 128M of RAM and a UDMA-based disk controller. You can get by with less, but only if you compromise.

XP beta 2 requires almost 1G of hard disk space. Like most betas, it is padded with bug-catching traps and redundant code, so the final tally is likely to be lower. Disk space requirements can also be trimmed by deactivating features such as System Restore, which uses several hundred megabytes for storing recovery 'snapshots', and by deleting the uninstallation backup of your previous OS. Make no mistake; Windows XP has a hunger for your hard drive.

The bottom line? The older your system is, the more likely your RAM, hard drive space, BIOS and legacy hardware will cause problems for XP. Microsoft has stated that PCs bought after January 2000 stand the best chance of a smooth run. The newer your machine, the better the experience.

Microsoft representatives have stated that the company will allow for the transfer of a shop-bought copy of XP from one computer to another. However, OEM versions of XP which come preloaded on a new PC will remain shackled to that system.

To save a generation of IT managers and system administrators from going prematurely grey, Microsoft has agreed to produce a special unlocked version of XP for corporate rollouts. These editions won't need to be activated on a per-computer basis — so pirates will make a run for this version of XP faster than you can say 'CD-R'.

PA has been implemented in the beta editions of XP in a way that doesn't allow for thorough testing, so a truly informed opinion on just how well this works isn't possible until XP ships. Even so, it's clear that the feature will be controversial. People might be hesitant to buy one copy of XP for each computer in their home. At least Office 2000 allows for two installations per suite.

A lot of people don't like the concept of product activation, and for good reason; it's a major obstruction to casual piracy. The problem is that 'casual piracy' most often refers to families installing the same program on several machines in the home. Microsoft is reportedly working on a scheme that would allow multiple-machine licensing within a family, but more information is not yet available.

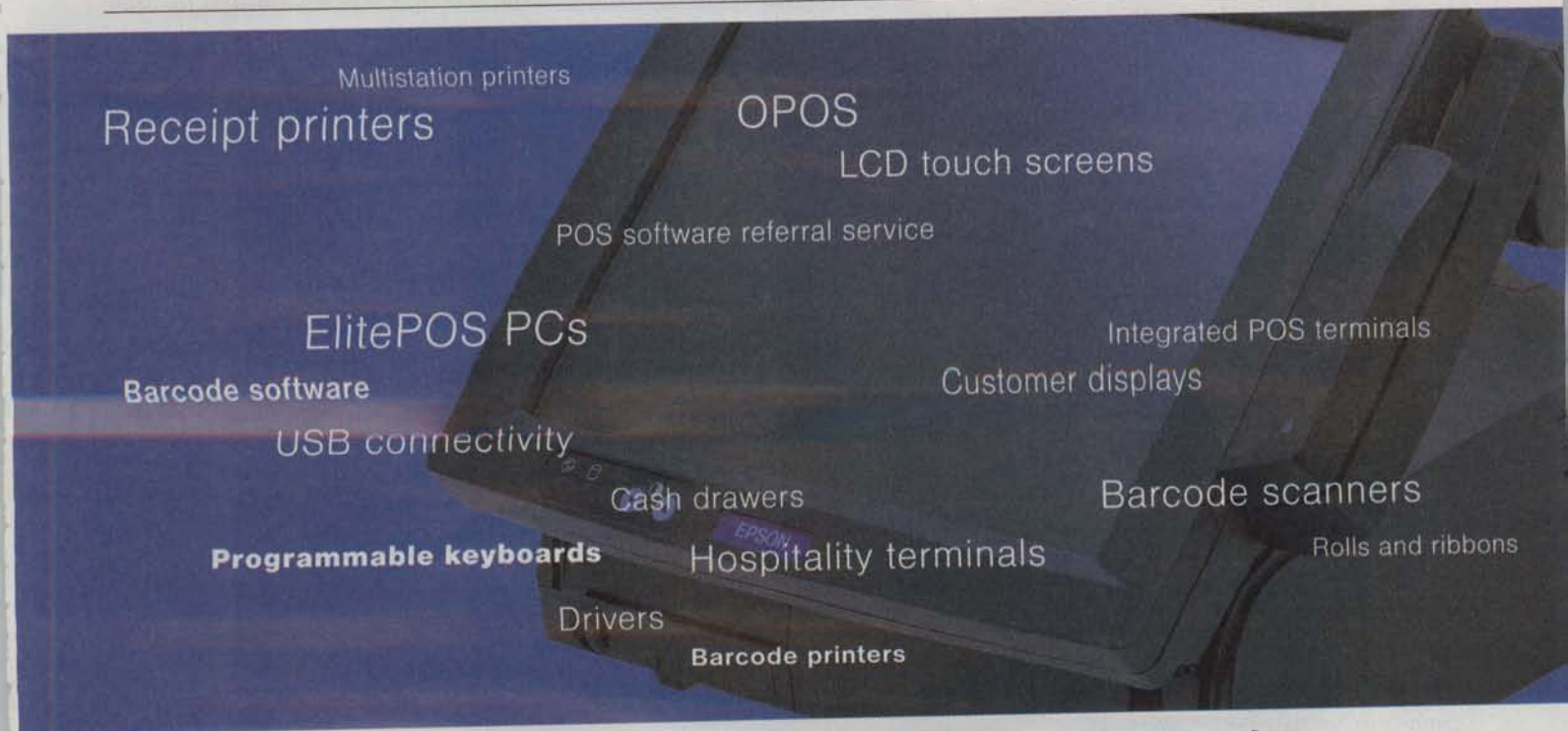
If you only have one computer, this won't concern you too much, but many people have two or more, and PA might encourage them to think twice about upgrading, or tempt them to skip Windows XP entirely and try a variety of Linux. On the one hand, PA could become one of Microsoft's biggest heartaches. On the other, we might be wondering what all the fuss was about a year from now.

Two (or more) can play

When it comes to sharing one PC between a group of users, older versions of Windows handle this in a manner that is, at best, clunky. You have to log out, then allow the other person to log themselves in. Worse, the default applies the settings of one user (installed programs, desktop configuration and so on) automatically to the others.

XP has what's called Fast User Switching. This allows you to jump from one user account to another with minimal fuss. A colourful startup screen prompts you to enter your name and password. You can be halfway through a document and listening to your favourite MP3 tunes, and then sign off — or just walk away, because XP's default is to return to the welcome screen and 'soft log out' the current user if the system sits idle beyond a set period of time. In the meantime, other people can log on and do their own thing. When you return you'll find all of your applications where you left them. It's like having two people logged on at the same time. Obviously, it makes sense to shut down applications if they're not in use, but this demonstrates the elegance of the underlying architecture.

Fast User Switching is based on Windows 2000 Terminal Server technology, which (as with Windows 2000) is rolled into the OS. It's also one of XP's main memory hogs — only those with 128M need apply. If you're stuck with 64M, Fast User Switching is the first feature you need to disable.



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Remotely useful

Helpdesk staff know the difficulties of talking someone through a particularly tricky PC problem over the phone. If only they could beam themselves to the enquirer's location and take them through the solution, it would be fixed in no time.

Windows XP doesn't support *Star Trek*-style teleportation, but it has something that's almost as good: Remote Assistance. Another implementation of Terminal Server, Remote Assistance allows you to replicate your desktop over a company network or the Internet to make it available to a remote adviser for coaching and troubleshooting purposes.

XP Professional goes one step further with Remote Desktop by permitting the remote user to take full control of your system, in a similar fashion to the remote control features of pcAnywhere. This is more suited to corporate support and remote administration.

The security implications of this are alarming, which is why Microsoft is at pains to point out the many steps involved in granting remote user privileges. A hybrid of NetMeeting and MSN Messenger provides the initial interface and requires you to send the distant user an invitation to which they must reply within a set period of time.

Once they respond, you approve their right to see what your desktop looks like. The remote user can then advise you by typing instructions into the NetMeeting client. Granting full remote desktop privileges is safeguarded by the same 'invite, reply and acknowledge' procedure, and all sessions are encrypted and password protected.

Even over a dialup connection, the process is reasonably fast, and over cable and DSL it positively flies. It's possible that Remote Assistance will move beyond pure technical support and perhaps find a role in computer training for inhouse and long-distance adult education.

However, the system has a problem that is difficult to solve because of the nature of the Internet. How does Remote Assistance work through a firewall? If the person making the remote connection is behind a firewall, there should be few difficulties, but if the person needing help is firewalled, it's harder to establish a connection. If both parties are firewalled, there are big problems. Microsoft's still trying to nut this one out.



▲ XP trades a cleaner desktop for a more crowded (but more functional) Start menu.

Bill's new groove

XP's most visible and eye-catching innovation is its interface. Codenamed Luna, it invites comparison with Mac OS X's Aqua shell. The Start button, taskbar, window panes, menus and other elements are built with soft textures and rounded edges. The visual conceits and cues are less subtle than Aqua: there's a lolly-green Start button, an orange X button to close windows, a swipe of yellow highlighter on active buttons and page tabs in dialog boxes. If you don't like the changes, you can undo most of the XP makeover by degrees or in one hit, in this case by reverting to the 'classic' 95/98 shell.

The XP desktop looks different, too, mainly because it lacks the conventional clutter of icons. With each successive release, the Windows 95/98 desktop became a dumping ground for Microsoft and OEMs. By comparison, XP's desktop is Spartan, devoid of all icons bar the Recycle Bin, and almost inviting you to make it your own space.

Desktop icons have greater depth and detail than before, owing to a richer system palette. Translucent icon placeholders mean that the wallpaper shows all the way around icons and under their titles, and isn't covered by little blocks of mismatched colour.

If you leave your desktop icons untouched for too long, the Desktop Cleanup wizard sweeps them into an aptly named Desktop folder. Like the now-you-see-me, now-you-don't menus of Office 2000 and Windows Me (which are also woven into XP), this is a typically well-intentioned feature that most expert users will quickly disable. The system icons that formerly held pride of place on the desktop are now located in the Start menu, but they can be restored to the desktop if you wish.

The Start menu is divided into two columns. The left-hand well contains a list of the most recently launched applications. These are sandwiched between icons for the applications you launch regularly (such as your browser and email client) and the rest of your applications, accessible from the More Programs arrow. Microsoft promotes this column as space for your own stuff.

The right column is for Windows' stuff: system folders such as My Documents, My Computer and the Control Panel. Like Windows Me's Start menu, it's easily tailored to your tastes by adding a list of the most recently used documents, or allowing the Control Panel and My Documents icons to open a second-level fly-out menu rather than a window.

Even the lowly Taskbar has some elegant additions. If you open several instances of a single program, their Taskbar buttons are grouped next to each other. Go beyond six windows and they're 'collapsed' into one button. Run your mouse over that button and a fly-up menu allows you to activate the desired window.

The System Tray is the third part of the desktop to be de-cluttered. Home to the clock and often about a billion other icons (most of which hijack the space for little

more than advertising) the tray returns to its original role as a system notification area.

Icons that don't tell you something (such as the time, the arrival of new mail or the need to update your antivirus signatures) are hidden behind a sliding panel. You can still get at them, or choose which ones will remain in the tray on an icon-by-icon basis. You can also turn the feature off if you don't like it. *APC* loved it.

The Control Panel sensibly groups control applets into nine categories, such as 'Appearance and Themes' and 'Printers and Other Hardware'. This is great for beginners and infrequent visitors to the panel who are likely to be confused by the usual proliferation of Control Panel icons (there are about 30 in the average Windows Me installation).

System folders now include three sets of links in a left-hand pane. The first set contains common tasks relevant to the contents of that folder. In My Pictures, these include viewing images as a slideshow or printing pictures. If you create a new folder and the first thing you copy into it is an image, the folder is automatically set up with the same set of context-sensitive links as My Pictures. Drop a ripped song into a new folder and you get the equivalent commands for My Music.

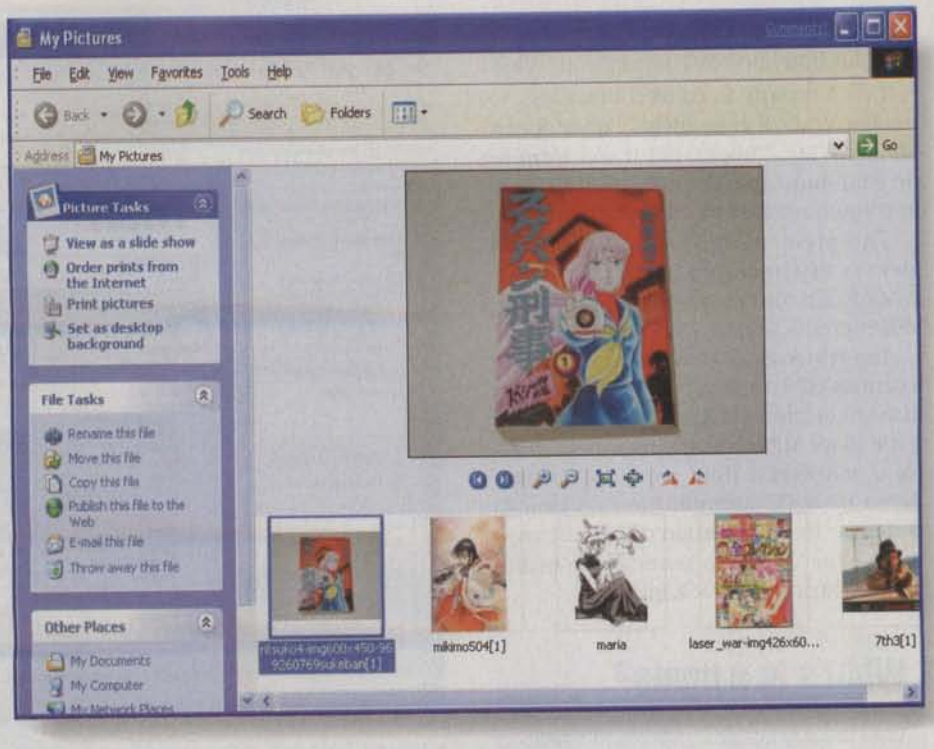
The second set of tasks are common file operations: rename, move or copy a file, email it or publish it to your Web site. The third group opens a view to other locations such as My Computer and My Network Places.

New tools

A host of XP utilities and technologies have been marshalled to protect your data and the integrity of the system.

XP Professional's backup utility is a big improvement on the next-to-uselesss Windows 95/98 efforts and the Windows 2000 routine, which worked only with tape drives. You can dump system images on to CD-RWs, network drives, Zip disks or anything else you can assign a drive letter to. The more comprehensive Automated System Recovery backup mode adds critical files such as the registry and system state to the archive and then takes you through the creation of a bootable floppy disk and CD, which can save your hide in the event of a total PC meltdown. This feature is not available in XP Home Edition, which is sure to annoy many home users now outfitted with CD-R drives.

Windows Me's System Restore will be new to those migrating from Windows NT and 2000. It saves a snapshot of settings and drivers so you can roll the system back to happier days if you encounter a serious glitch. However, there are limits. When *APC* used System Restore to go back to a state that included a program since uninstalled, the program reappeared but refused to run correctly. This may just be a beta issue that is yet to be addressed.



▲ Improvements in the shell make it easier to manage picture files.

The Files and Settings Transfer Wizard will be much appreciated. It allows you to dump everything from customised system settings to specific files and complete folders on to your hard drive, removable storage media such as a CD or Zip disk, or a shared network location. You can then run the wizard on another XP machine and load this image to quickly set up a new system to your liking.

Other small but smart touches abound. You can queue files to be burned on to a CD by shooting them to a new option in the Send To menu, or even drag them on to the icon for your CD-R drive.

If you open a particular file type with different programs, and use the right-click Open With menu to choose the application in each case, it will be added to a list on the Open With menu.

If you connect a digital camera, you can preview and work with snaps directly on the memory card, and you can print images in a number of sizes and space-efficient layouts so you get your money's worth from expensive photo-quality paper. This task is performed inside the XP shell without running a single third-party application.

Finally, the new ClearType typeface-rendering system increases the horizontal resolution available to onscreen typefaces by about 300%. It works best on LCD panels, and the results are striking. However, ClearType rendering isn't consistent; it works brilliantly on some displays and horribly on others. This is probably one of the most obvious beta problems.

Go surfing, or just play around

XP includes upgrades to Internet Explorer 6 and Windows Media Player (WMP) 8.

WMP 8 looks and sounds a million dollars when compared to its predecessor. WMP 7 was slow, bloated, clumsy, had more than a few bugs, and took up far too much screen space to be useful. It wasn't in the same league as tightly written, efficient applications such as WinAmp.

WMP 8 doesn't completely overcome the problems of WMP 7. It's still a little large, even in its 'compact' mode, and the supplied skins are ugly, but it's much better in many other ways.

The Windows Media codec produces results that must be seen and heard to be appreciated. If you listen to the same track ripped in MP3 and WMP 8, the difference is clear. The WMP 8 sound is halfway between FM and CD fidelity at 48K, and extremely close to CD quality at 64K. MP3 demands twice those rates to match the sound quality. This means you get twice the music per megabyte — a huge advantage for anyone with a portable digital music player (as long as it supports the Windows Media codec).

However, if you've already ripped your CD collection into WMP format with WMP 7, there's no way to convert those files to smaller WMP 8 equivalents. WMP 8 can handle WMP 7 tracks, but if you want to rip your music into the tighter WMP 8 format you have to start all over again.

The great news for producers and viewers of streaming Webcasts is that WMP 8 can also play video approaching VHS reproduction at 250K.

The Windows XP beta 2 version of WMP 8 permits MP3 ripping, but don't expect this in the final release of XP or the player. WMP 8 still plays MP3, but ripping is only possible if you load a third party plug-in produced by a PC manufacturer seeking to customise its OEM version of XP. Microsoft is using the XP beta to test one plug-in, but it's pegged at a lowly 56K bit rate.

What's in a name?

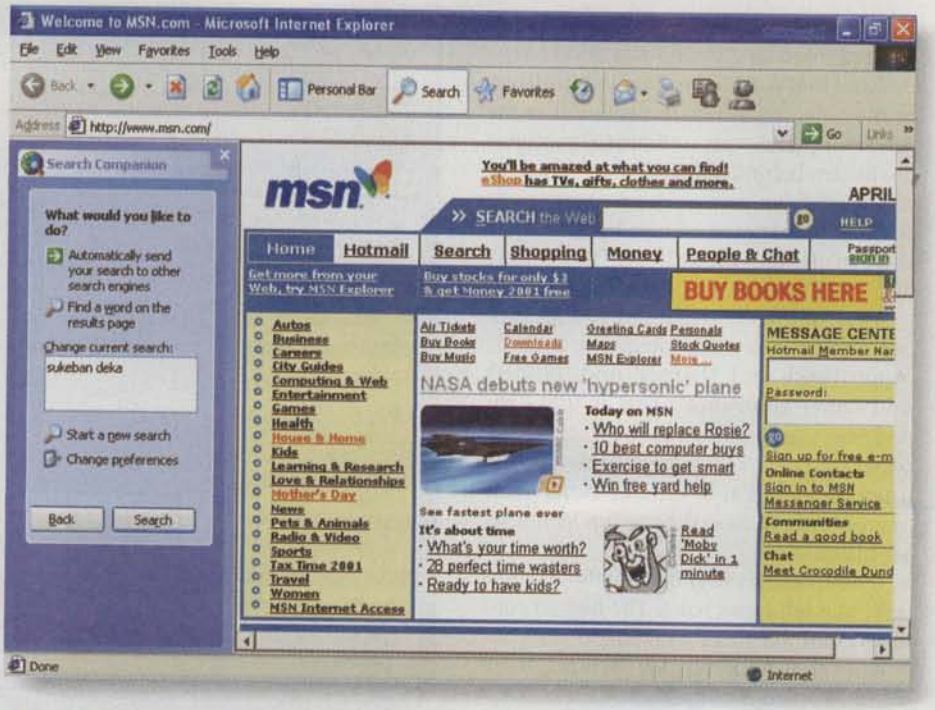
Until January last year, Microsoft's next-generation operating system was referred to by the codename Whistler. By now, it's common knowledge that the new XP moniker stands for 'experience' (no, APC doesn't quite get it either). How did the codename Whistler come about?

The Microsoft crowd loves codenames, and has so far used three series of nicknames for its operating systems. The original Windows 95/98 line was named after US cities: Chicago (Windows 95), Detroit (Windows 95 OSR 2), Nashville (a Web-centric facelift to Windows which started at Windows 97, but became Internet Explorer 4) and Memphis (Windows 98).

Then came a flirtation with astronomical objects. Mars was a version of Internet Explorer reshaped as MSN Explorer, and Pegasus, Apollo, Mercury and Jupiter were versions of Windows CE. Asteroid and Odyssey were planned updates to Windows 2000, Neptune was a project to give Windows a radical new look and an HTML-based interface, which was later rolled into Whistler, and Luna was the user interface layer of Whistler.

Whistler is named after a mountain in British Columbia, Canada, which is a popular destination for Seattle skiers (including a legion of powderhounds at Microsoft).

The successor to Windows XP has already been tagged Blackcomb, after Whistler's neighbouring mountain.



▲ Internet Explorer 6, XP's bundled browser, is still a work in progress.

The omission of native MP3 ripping is far from ideal, but at least WMP 8 will be capable of recording in MP3 format. This is a first for Microsoft's media player range. Most MP3 connoisseurs will stick with their favourite ripping software, and those who don't care what format their music is in as long as it sounds good will happily burn in Windows Media format. Ripped tracks can be written directly to CD-R and CD-RW at the full recording speed of your burner.

The meta-information fetched from the All Music Guide when you load an audio CD now includes the album art and, if available, lyrics. Almost all the discs we inserted, even some very obscure titles, came up. This is integrated into the shell so that when you view collections of ripped tracks in My Music, any folder containing tracks sourced from one album displays the album's cover as its icon. If you store several albums' worth in one folder, you see thumbnails of the first four covers.

If you move those files and folders to a different location, integration between the player and the shell allows the Media Library to keep track of them for you.

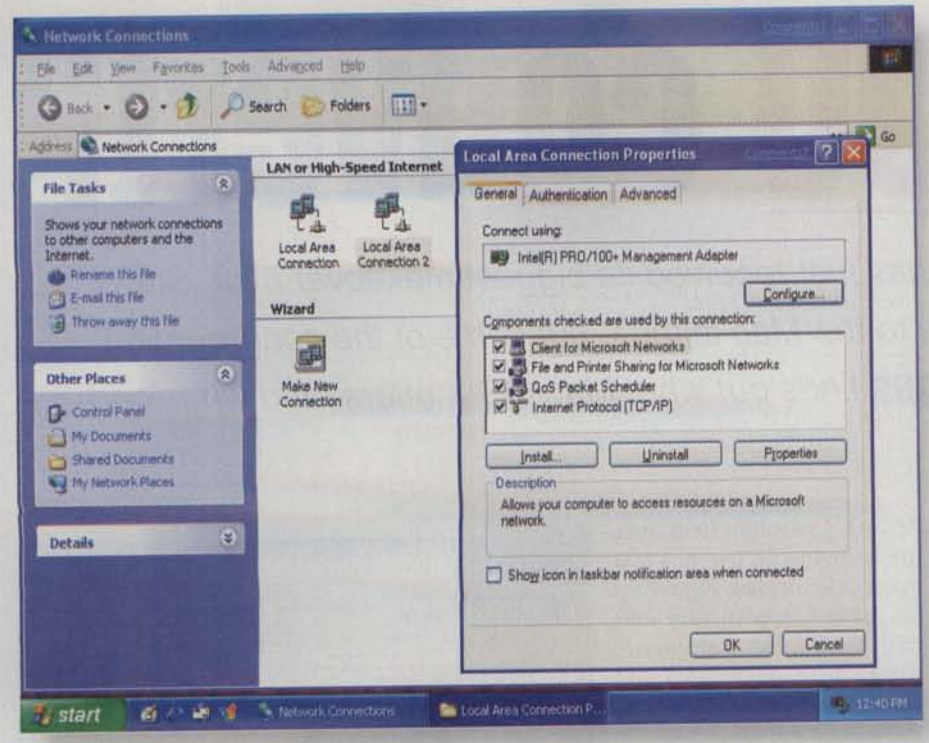
Finally, WMP 8 can play DVDs. However, for copyright reasons, you need to install a hardware or software decoder. *APC* achieved surprisingly good software-only playback on a 333MHz Celeron, and on faster machines you'll enjoy a lush full screen (letterboxed) mode that displays DVD chapters directly in the playlist, so you don't need to return to the DVD's main menu to jump between scenes.

With Internet Explorer, things are less certain. The beta of Internet Explorer 6 in Windows XP beta 2 is already out of date. As *APC* to press, Microsoft dropped two formerly trumpeted features — the Personal Bar and the Contacts Bar — as they repeated other functions available in Internet Explorer.

Still on the menu is the Media Bar, which plays audio and video through a pint-sized WMP 8 control instead of launching the full-blown application. It also provides superior handling of images, including a shrink-to-window option for large pictures and a set of image-related commands in an optional Image toolbar. One bundling move that left *APC* underwhelmed was the forced inclusion of MSN Messenger.

Internet Explorer 6 integrates a new W3C-derived privacy policy checking system that determines whether sites you visit are secure or compromise your privacy in some way. The system includes a built-in cookie manager that makes it easier to exclude all or some cookies. It's a little *too* sensitive sometimes, but this might be because the standard settings haven't been completely checked yet. You can configure the privacy detection with a high degree of precision.

On the whole, Internet Explorer 6 is more robust and more attractive than any previous version. Much of the browser's stability could be due to XP's influence, as Internet Explorer 5 was quite solid on Windows 2000. XP seems to confer bulletproof performance on just about everything run under it.



▲ XP introduces some new networking features to the operating system.

Networking that just works (almost)

Home networks are on the rise, and just about any company with computers has a networked environment. However, having a PC configured to use those networks is another story.

Home users of Windows Me are probably already benefiting from the Home Networking wizard, which appears in an NT-based form for the first time in Windows XP. The setup process has been streamlined and a personal firewall has been added to the operating system. This works on a connection-by-connection basis, so if you have more than one network adaptor or Internet connection in your system, you can configure them separately.

The default configuration keeps casual intruders out of your system, and when tested on Gibson Research's Shields Up site (grc.com), the firewall did a nice job of screening the system from not-so-casual port probing as well.

You can't use File and Print Sharing through a firewalled connection, but running these shared services across the Internet is generally considered a security hazard anyway. The firewall can also be set to allow or disallow specific ports, protocols or applications, depending on your needs.

It's not a fully fledged substitute for programs such as BlackIce Defender or ZoneAlarm, but it's a good start, especially for home users who may be moving to DSL, but are unaware of the risks inherent in connections that are always on.

XP embraces the 802.11 wireless network standard (but not Bluetooth, which Microsoft claims is too immature to be worth the trouble in this release), and automatically configures itself for any available network. If the connection drops out — for example, if you and your notebook step into an elevator in a building otherwise saturated with 802.11 nodes — XP doesn't throw a tantrum or lock up. The 802.11 components wait patiently until you're back in range (reconfiguring themselves if you enter a new network), and allow you to carry on with the rest of your work.

Some low-level networking resources have also been introduced into XP. Some of these have been imported from NT and Windows 2000, but others are stepping out for the first time. QoS (quality of service) is a new network component designed to optimise network traffic on high-traffic connections. It ensures that services needing the best possible throughput, such as streamed media, get to where they need to go.

The Network Bridge allows you to connect two totally disparate types of networks, such as Ethernet and 1394/FireWire, invisibly. This is useful if you have a PC suitable for bridging networks and would rather use this than spend money on dedicated hardware.

In addition, you can configure a network card to handle two different configurations and automatically detect and switch between them, according to your location profile. This will make life easier for the many notebook users who swap between work and home networks almost on a daily basis.

This isn't to say the networking is flawless. If you have a mixed network of Windows 95/98, Windows 2000 and Windows XP clients, talking to the 95/98 machines can be a little tricky if you rely on the standard settings. The solution often lies in disabling one or two of the network settings that are enabled by default in Windows 95/98. For some reason, Microsoft assumes that 95/98 machines are only used in peer-to-peer arrangements with other 95/98 machines, which is almost never the case.

Is XP worth the wait?

APC believes that the answer to this question is a qualified 'yes'. Beta 2 is undeniably impressive, but there is still a bit more work to be done on fit and finish — that's why it's a beta. From what we've see so far, it looks like the version of Windows that Microsoft has been promising for years; the one that will come closest to making good all those promises about the 'digital lifestyle'.



▲ Product Activation is sure to provoke some controversy among XP's users.

Will YOU convert?

The Mac operating system has just received its biggest makeover ever. Steve Jobs is preaching its virtues to the Mac faithful, but some of the congregation are not too sure. ***Fiona Angus*** *finds out what Mac OS X offers, and what kind of reception it's had so far.*

The first shipment of OS X sold out in two days at one central Sydney Apple shop. Two weeks later, Mac fans were still walking away empty handed. According to staff, the rush has been driven by curiosity and media hype surrounding the metamorphosis of Apple's most important package.

The hype is beginning to fade now, and the Mac faithful are wondering whether or not to embrace the new operating system. Fans who have already installed OS X are suffering the consequences of being the guinea pigs for the final version. Software and hardware compatibility issues have plagued them, and some have been confused by a system that requires them to continually switch between OS X and the old OS 9 environment. Initial reports show that many aren't coping with running two operating systems at the same time.

The decision to convert to OS X is not to be taken lightly. In the words of Apple CEO Steve Jobs, "Mac OS X is the most important software from Apple since the original Macintosh operating system in 1984." However, early indications show that many Mac fans are holding off on making this big change.

Genesis

In the beginning, Jobs created the Macintosh. It was formless and empty, and darkness hovered over the surface of the screen. So Jobs said, 'Let there be Mac OS,' and there was. Jobs saw that the Mac OS was good, and he separated the Mac from the PC, and behold, he was very pleased.

Not any more. Apple stood by the principles of that first Mac operating system for 15 years, making only minor and incremental changes. If Mac fans were transported in time from 1984 to 2001, they'd feel right at home on any Macintosh computer. Now, Apple has thrown out the old system and constructed an entirely new one.

According to Apple Australia's corporate affairs manager Myrna Van Pelt, Apple's Australian help lines are receiving an average 600 extra calls a week regarding OS X. "It has been very well received by our customers," she said. In some cases, the flood of calls has led to long waiting times.

Apple divides the callers into two groups. The first group are 'hard core' Mac fans — people who have used the public beta version of OS X and have complex questions that often require lengthy research. According to Van Pelt, this group forms a "significant proportion" of people who have purchased OS X so far.



▲ Mac fans told Apple to make OS X look more like the old Mac OS.

The second group are people who are less familiar with Macs. Van Pelt said these callers have problems understanding how to run applications built for OS 9 within OS X. People using OS X have to boot up OS 9 within OS X, so the computer is running two separate operating systems at the same time. OS X is a completely new and separate operating system, not just an update on the previous OS. None of the old Mac software is compatible with OS X and Mac users have never encountered this situation before. Van Pelt claims that apart from this confusion, callers have indicated they have found OS X easy to use.

Exodus

OS X has not been a universal success. Some Mac users feel Apple has turned its back on the loyal fans who sustained the company through the bleak '90s. "I am not impressed with a whole new system which has little or nothing that relates to the old and trustworthy system that came before it," one Mac fan declared. Could OS X make loyal supporters move away from Mac?

A similar feeling of disenchantment emerged when Apple first launched the iMac in 1998. The 'fashion-conscious' hardware was incompatible with older Macs, and many resented having their computers made almost obsolete over-night. Since then, Apple has released new, trendy hardware each year, despite most consumers not being able to keep up with the rate of turnover. The iMac seduced some PC users, but many people are asking how long the fashion gimmick can sustain Apple, and whether Mac fans will continue to stand by it. OS X is part of Jobs's vision of a 'digital lifestyle'. However, Mac fans aren't usually the type to want to keep up with the Joneses.

During OS X's public consultation period, Mac customers indicated they wanted to reinstate many of the longstanding features abandoned by the new OS. More than 100,000 people purchased the public beta version of OS X, and Apple received 75,000 individual feedback entries. In response, Apple reinstated a number of the features discarded as a result of the radical changes.

In the public beta version, Apple blocked access to the desktop and introduced a hierarchical Finder similar to Windows Explorer. The final release of OS X allows limited access to the desktop.

Apple's attempt to abolish the Apple menu and replace it with a purely decorative Apple icon also proved unpopular. The Apple menu was reinstated in its previous position at the far left of the screen, and it regained basic functions such as Restart, Shut Down and Preferences.

Acting on criticism that the Dock was unwieldy, Apple reintroduced the pop-up menus first used in OS 8. Overall, the changes responded to a widespread call to make OS X more like the old Mac OS.

Revelation

Despite these concessions, OS X is still completely different to any other operating system ever released. The rush on shops revealed that many Mac fans want OS X. The preliminary release of Microsoft's latest OS, Windows XP, looks like a poor cousin to OS X. Microsoft has tried to mimic many of the organisational and graphical elements of OS X, but it hasn't managed to reproduce its style and elegance.

The final release of OS X is remarkably free of glitches. However, a number of bugs still need to be sorted out, such as inconsistent fonts, and hardware and software compatibility issues. Three weeks after OS X was released, Apple put out a minor update (version 10.0.1) to improve the stability of older Mac software and USB support. OS X is expected to be included with new hardware from July. To receive the updates, a new command embedded within OS X must be used.

Apart from novelty value, the main benefit of adopting the new system is increased stability. OS X is harder to crash than any previous Mac OS. It is built on an open source UNIX-based platform (nicknamed Darwin), and has protected memory, so when one application crashes, the entire system (and other applications you have running) are not brought down with it. Preemptive multitasking allows you to work in one application while other programs execute tasks in the background, and if you have a Mac with multiple processors, OS X provides software acceleration. OS X's automatic networking makes it easier to connect to the Internet, and there is a single interface to manage all network connections.

At present, only a handful of applications support OS X. Jobs said that about 350 applications were available specifically for OS X when it was released on March 24, and "hundreds" more are "coming" over the next six months. She said that more than 10,000 developer organisations around the world are working on over 20,000 Mac OS X applications.

Making more software available for OS X is out of Apple's hands. It is up to developers such as Adobe, Macromedia and Microsoft to release products for OS X. Until this new software is released, many of the features of OS X are unusable.

OS X does not come up to scratch in hardware support either. It does not support CD-RW, DVD and DVD-R drives. This is a major shortcoming, because the major selling point of the latest Mac desktops is built-in CD and DVD burning capability. To burn CDs, OS X must boot up OS 9. Correcting these hardware support issues in OS X can be complicated, because OS X does not allow software applications to directly access the system hardware. Six weeks after OS X hit the shops, Apple released a second update that added CD (but not DVD) burning capabilities At one point, Apple released a firmware or hardware settings upgrade for OS X that completely crashed some Mac systems' memory.



▲ OS X: A trendy OS to dress up the 'fashion-conscious' Mac hardware

The major drawback of using OS X is speed; OS X users must revert to the OS 9 environment for many of their activities. Running two operating systems simultaneously is slow going. Applications run noticeably slower in the OS 9 environment, and continually rebooting OS 9 can be tedious.

Despite the growing pains, it looks as though Jobs's new creation will be successful. Some traditionalists might be irked by the transformations, but Mac users have no real alternative to adopting OS X — unless they want to convert to the PC.

For most Mac users, the real question is *when* they will move to OS X. Its seductive style and stability may tempt many to try OS X sooner rather than later.

Be fruitful, and multiply

OS X is much more stable than any previous Mac OS. It's great for surfing the Web and has a fabulous interface. However, OS X is an unknown entity and a host of minor bugs still need to be eradicated.

What OS X really needs is more software. Running older applications in OS X is tedious and slow, and the biggest drawback to converting.

So far, only a handful of applications are available for OS X. Most of these are from niche software developers and are smaller applications. Games are also thin on the ground. In April, Apple held a developers' conference so companies could showcase their progress on OS X applications.

Early indications suggest that when OS X versions of many popular applications are finally released, they will boast features that take advantage of the improved capabilities, such as protected memory and multitasking. For example, the newly released Internet Explorer 5 for OS X has a new rendering engine named Tasman, which Microsoft claims provides a 50% increase in performance. Microsoft also claims the browser has unique features, such as the Auction Manager, which can track and complete multiple Internet auctions simultaneously. Its Internet Scrapbook can capture, store and organise Web pages.

Of the major software developers, only Macromedia had released its product FreeHand for OS X. At the time of writing, Adobe, Microsoft, Quicken, MYOB, Palm and Symantec were yet to release their major software packages for OS X, but Symantec provides limited virus protection through a mix of CD and OS 9 compatibility. Of these companies, only Microsoft is revealing any kind of timeframe for releasing software; it says Office for OS X will be available in the second half of the year. Apple has released its most popular applications, such as Final Cut Pro, iTunes and iMovie 2 for OS X.

Other must-have software so far available includes:

- Adobe Acrobat Reader 5.0
- AOL Instant Messenger
- Eudora Pro
- Fetch
- Fizzilla: Mozilla for Mac OS X
- GraphicConverter

Charity begins online



The Internet is being used to pitch all kinds of charities. Some use the Web to disseminate information about their work and to raise money, but others take its potential a step further and use it to reach the people they're trying to help. ***Jocelyn Hungerford*** *examines online charity and asks how effective it is.*

Charities have been quick to seize the opportunities offered by the Internet to publicise themselves and gather more support for their activities. Many advertise themselves using prewritten emails, which they encourage supporters to send to friends; but others realise that many people consider this type of publicity to be spam. Instead, they provide banner ads on their Web sites, which supporters can use on their own pages.

The Internet is an ideal medium for all kinds of scams, so it's almost inevitable that online charities are regarded with a degree of scepticism. Many charitable projects focus on providing help overseas, so it can be difficult to know how successful a project really is. However, this is equally true of projects that don't have an online presence. The advantage of the Internet is that you can also use it to verify what a charity says about itself. You can't do that with television or a newspaper.

Most established charities have an online presence, and consider the Internet to be a vital means of communicating with supporters, potential supporters, and sometimes the people they are trying to help. For example, 'Bullying Online' (www.bullying.co.uk) is a resource for children who are being bullied, and for their parents. It provides information on how to cope with and stop bullying, and a free, email-based counselling service where children and parents can email trained counsellors to ask for advice.

However, the Web has also produced many 'charitable' projects that use the Internet's capacity for distributing information as a means of doing business, using charity as an extra lure to entice people to buy products. Type 'online charity' into any search engine and you'll be hit with a list of sites for businesses trying to sell you stuff. As an extra incentive to buy, they donate a (usually extremely small) percentage of the profits to a charitable organisation. It's only after you've waded through the first two or three pages of search results that you start to see any sites that resemble 'genuine' charities, rather than conduits for funds. No doubt their intentions are good, but online as well as offline, profit still comes before philanthropy.

Charity is a broad concept; it means giving help to those in need, but this can take many forms. It can include funding research into diseases or development projects in third-world countries, providing food and shelter to the poor, helping to find missing persons, and providing counselling.

The Internet is an information medium, so it can do a lot to increase awareness of the problems charities try to address. Most major charities have a Web site explaining what they do and why; how you can help, either by volunteering or donating money; and many of them have an online credit card facility for making donations. Probably one of the most important tasks for a charity is increasing awareness, as people are more inclined to help if they can make an informed decision. The relatively low cost of maintaining a Web site, and the ease with which it can be updated, makes it possible for charities to disseminate their information widely and continuously without wasting precious resources.

One problem that charities commonly experience is 'sympathy burnout'. For instance, an earthquake can generate an immediate sympathetic reaction, but sustaining interest in long-term responses to the crisis is not so easy. Web sites are ideal for providing people with regular information about what a charity is doing about a problem and how effective it is.

For example, the Oxfam/Community Aid Abroad site has comprehensive descriptions of the charity's projects, the problems it addresses and the policies it follows. There are also interesting exercises you can do, such as finding out all the different ways a sum of money can be used. The site is primarily an information resource to educate people about what the charity does. There are also details on how to donate or volunteer. It encourages people to include links to the site on their own Web pages, and offers a selection of banner ads. It recommends emailing friends to tell them about the site, but there is no ready-made blurb about CAA that can just be forwarded. This is probably a good thing, as people are more likely to pay attention to a personal email from a friend than to a prewritten message that looks like spam. The site also has A4 posters available for downloading.

CAA does a certain amount of fundraising by selling products. However, the commercial site is separate from the charity site, and you can browse the charity site without being assailed by advertising imploring you to buy, buy, buy. There is a notable lack of hard sell; if people want to support them by buying their products, that's fine by CAA, but if they want to donate or help in other ways, there is plenty of information to help them do so.



▲ Some of the banner ads available from the CAA site

It's a good example of a site that's being used for a combination of fundraising and consciousness raising. In marked contrast to this are commercially operated sites that exist solely to raise funds. Information on how they use those funds isn't very extensive. Projects of this type include the Hunger Site, CauseLink, CharityMall, Chernobyl Charity Online, iGive.com and WebCharity, but there are many more. They aren't necessarily scams, it's just that their primary focus is selling, not addressing underlying problems.

Consumerist charity

It can be argued that a great deal of poverty is a direct result of the consumerist, acquisitive societies that characterise western or 'developed' countries. A great deal of resources go into producing consumer goods that are mostly frivolous and unnecessary. Instead, these resources could be used to make sure everyone has enough to meet their basic needs.

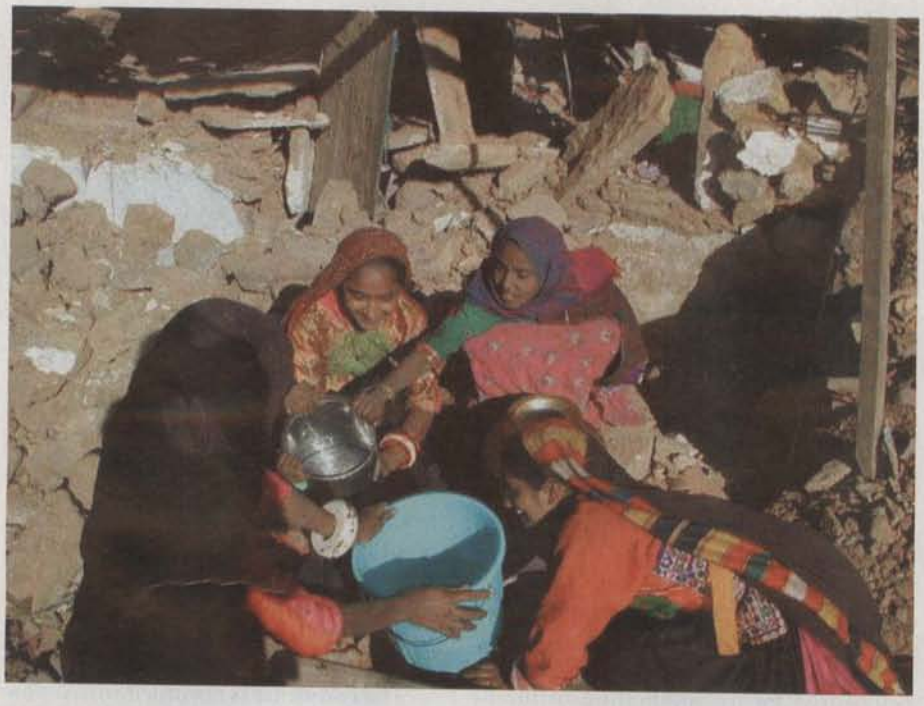
Some online fundraisers have hit upon the idea of capitalising on consumerism, and utilising the Internet's potential as a selling tool to raise money. The Hunger Site is a particularly well-publicised example. The idea is that every time you click on the 'Donate Food' button, the sponsors of the Web site donate enough money for one cup of food. Related sites such as the Rainforest Site and the Kids AIDS Site use the same principle.

The benefit to the sponsors is that they get to flash ads at you, and the site encourages you to visit them and buy from them. If you shop with them as a result, they donate a further percentage to the Hunger Site's food project. This is great if you want to buy their stuff, but what if you don't? The system operates on the assumption that people always need an incentive, preferably a tangible one, to help charities.

The consumer is rewarded with a new T-shirt, candles, flowers or credit card (to list some of the products advertised on the site) and the advertisers are rewarded with more business. This is fundraising as a side effect of doing business, rather than taking direct action. It's worth considering that the resources that are being put into making and selling the products might be better used to directly help communities in need.

Of course, if you want to buy something, it's worth finding out whether you can get it from a company that will donate part of the profits to charity — and the Internet is a very convenient means of conducting your research. However, if you just want to help, it is a good idea to use the Web sites to compare how different projects would use your money. You could spend $US22.95 on a lovely jumper with The Hunger Site logo on it and they'll donate the money for 25 cups of food on your behalf, but roughly the same amount donated to CAA ($50 is the specific amount quoted) "is enough to supply seeds which will produce food for one family in Mozambique for a whole year. It also buys enough chicks and feed to enable a woman to kick-start a money-earning poultry business in Mozambique."

The Hunger Site's most recent report claims that the project has generated "nearly 2 million cups of food", but it's important to realise that food aid projects are sometimes not appropriate. For example, they can interfere with the local economy and create dependence on the aid. For further discussion on the efficacy of The Hunger Site, see www.kuro5hin.org/?op=comments&sid=2001/1/28/10618/1402&cid=33.



Missing persons

As a research tool, the Internet is spectacularly efficient and it has been a great help in one area in which charities have been active for years: finding missing persons. As its reach is global, the Internet is ideal for disseminating descriptions and photographs of missing persons around the world. Time is often critical when people go missing, so the speed with which information can be sent out is a major advantage that the Internet has over traditional means.

This type of charity work also suffers from the same problem as disaster response-based charities — the issue can disappear from public consciousness very quickly. When children disappear and foul play is suspected, the story usually makes the news, but it generally stops being reported after a few days. Stories about adults who disappear are reported more rarely. A Web site has the advantage of being able to keep the information about the person accessible for years after they disappeared. There's no guarantee that people will check the sites, but it's better than nothing.

A variety of sites exist to help people find each other. The Missing Persons Cybercenter (missingpersons.com/index.html) hosts a bulletin board where people can post messages about missing persons, as well as a board where descriptions and photographs can be posted. A broad range of people leave messages; some are just trying to find old friends, but others are seeking help with finding abducted children, runaways or people who have disappeared in suspicious circumstances.

Sometimes people don't want to be found, but would still their families to know that they are alright. The site for the Australian Missing Persons unit features a section called 'Are you missing?' This approach respects the missing person's right to remain untraceable, but also provides information on how a message can be given to the missing person's family. The service is probably most helpful for people who have run away or disappeared of their own accord. Email has the advantage of being cheaper than long-distance phone calls and faster than a letter.

Again, the Internet's capacity as an information medium is probably what makes it most useful. The home page of the National Centre for Missing and Exploited Children makes use of this by providing advice about how schools and parents can keep children safe, as well a brochure of advice called 'Know the Rules' for teenage girls.

Counselling

Part of the traditional work of charities has been counselling, as it is often 'private' issues such as mental illness, domestic violence, incest, drug abuse and so on that can lead people into problems such as poverty, homelessness and trouble with the law. The Web can be used constructively and directly to provide help, advice and support for people with these problems, especially as they are often a source of shame. The Net's anonymity makes it an ideal forum, and sufferers are able to help each other by sharing their experiences and coping strategies. Of course, the quality of advice depends entirely on where you look, but that's true offline as well.

Often the beginning of solving the problem is becoming aware that other people suffer from similar problems. Sufferers realise that they are not alone or crazy, and that there are constructive solutions that other people have tried successfully. It's probably the only circumstance where consciousness raising can be so directly and immediately beneficial. Of course, these benefits are limited to people with Internet access.

The Internet has provided a multitude of opportunities for charities to get their message across about what they do and why you should care. The most innovative projects are those that use the Internet not merely to raise funds, but to reach the people they are trying to help. The Internet can be so much more than a means of persuading people to buy. Tangible results are required, and the advantage of the Internet for charities is that they can use it to show that what they do actually works.

Choosing a charity

There are plenty of online outlets for your goodwill, but it's important to consider whether the charity you choose treats the cause of a problem or just its symptoms. It's a good idea to thoroughly investigate any charity you think you want to support before you commit to it; make sure you find out exactly what the organisation does, whether it's helping and not doing further damage, that it accords with your own principles and that your money will be used for maximum benefit. Beliefnet (www.beliefnet.com), a site devoted to "spirituality, religion and morality", has a section that includes discussions about the ethics of charity, some advice on how to choose one, and a list of questions you should ask about a charity before you commit to it. These questions could include how they apportion the money they receive and whether they can provide you with proof that what they're doing is working. The site provides many useful tips, but any site that purports to discuss beliefs in depth and then proceeds to bombards you with advertising for weight-loss programs (as this one does) needs to be viewed with some scepticism.

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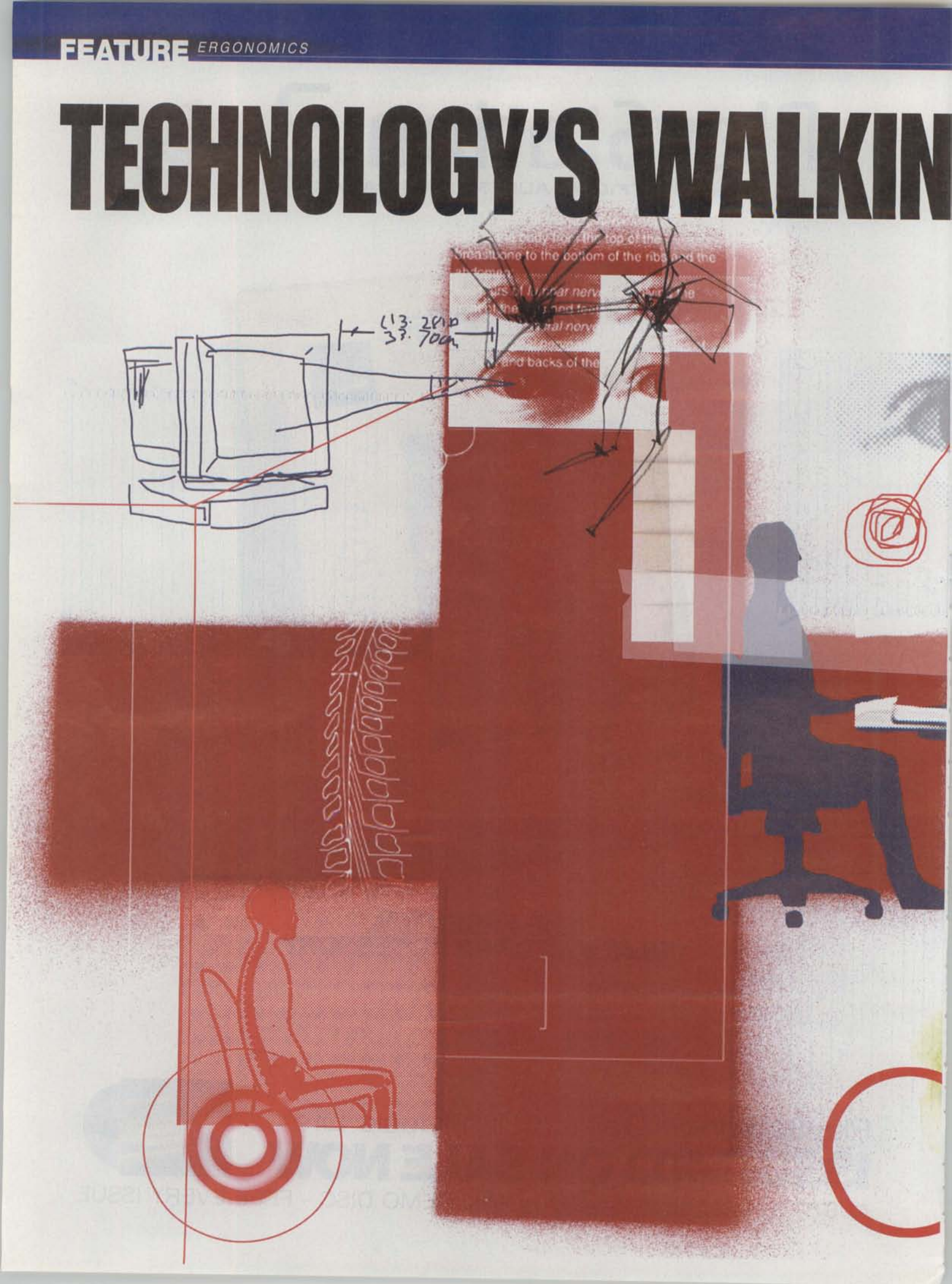


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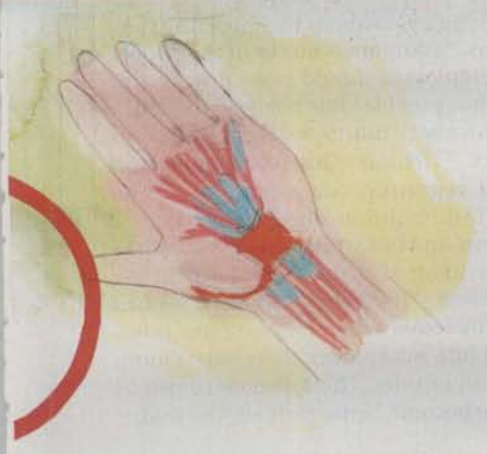
It starts as a tingling in your right hand. For a while, you dismiss the annoying ache moving up your wrist, but then the serious pain sets in. Before you know it, you are another casualty on the information superhighway. ***Alex Kidman*** *and* ***Fiona Angus*** *look at the hardware and software available to help you avoid serious injury in the digital age.*

A computer doesn't have to be dropped on you from a great height to land you in hospital. Modern lifestyles increasingly revolve around PCs; from the workplace to the home and leisure activities, a computer is often involved in some way.

Overusing your PC can cause all sorts of horrible injuries. The most common PC injury is carpal tunnel syndrome, which is caused by excessive keyboard or mouse use. However, this is just the tip of the iceberg. PCs are also among the leading causes of muscular-skeletal disorders, deteriorating eyesight, spinal cord damage and various forms of repetitive strain injury (RSI).

Ergonomics consultant Mark Dohrmann deals with hundreds of legal cases each year involving PC injuries. Most of these cases involve poor workstation design and employers who do not allow workers to take breaks when they need them.

"Employers do not need to spend megabucks on all the latest multi-adjustable equipment recommended by salespeople who call everything 'ergonomic'. They



The ergonomic office

Ergonomics is about making your workspace work *with* your body, not against it. So, it's important to start with the basics of lighting and posture.

'Task lighting' is designed specifically to illuminate your work area. Most commercial offices have ample lighting in every direction, but some tasks benefit greatly from a desk lamp. An easy and affordable option is an architect's lamp fitted with a bulb, not a cheap fluorescent tube.

Home offices don't always provide optimal lighting conditions. The single overhead light common in most homes is far from suitable, because you usually end up working in your own shadow. Consider downlights that shine directly onto the desk, or the architect's lamp.

When it comes to your chair, get the very best you can afford — even if you can't really afford it. Not only will your back thank you, but you'll be able to work longer and more productively. Speak to a number of office furniture specialists before making your decision, and test drive every chair you can.



If you're in a large company, consult your occupational health and safety (OHS) officer and make sure your chair and desk are properly adjusted to suit you. While you're at it, have the OHS officer check your keyboard posture as well as the general layout of your desk. Many people arrange their computer at awkward angles, often in corners where they then have to over-reach to use the mouse.

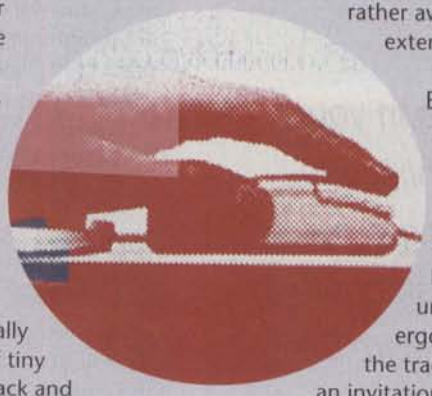
Regardless of how well-adjusted your workspace is, nothing beats a break from the grind. Get up from your desk every hour and go for a wander. Grab a cuppa, fetch those files from downstairs (take the stairs, not the lift), go to the toilet or stop for a minute or two to chat to colleagues. They could probably use a break as well.

David Flynn

Ergonomic mice

Ergonomically, no item on your desk is more capable of doing you harm than your mouse. Most people use mice far too much, position their arms incorrectly, and worst of all, repeat small motions and take no break between actions.

The graphical user interface has seen the mouse become a primary input device. Previously, it was a complement to keyboard input, especially in movement-intensive areas such as gaming. The average game of Quake typically involves thousands of tiny mouse movements back and forth. Play it for a few years, and a lifetime of RSI could be your reward.



Your choice of mouse shape should be guided by comfort. Most Microsoft mice are relatively flat and contoured to the left or right, depending on the handedness of the user. These devices are fine if they fit your hand well, and the same goes for other brands such as Honeywell and Logitech. In theory, an optical mouse is a little safer than a ball mouse because the latter has a tendency to collect grit and dust. This makes movement across the surface harder, increasing the number of mouse movements required to complete an action and extending the total time spent using the mouse. It's also stressful; muscles tend to tense up, making the wrist movements that most people do while mousing all the more damaging.

Trackballs are often touted as being more ergonomically sound than mice. This depends on how you use the trackball. The position of the ball, and its size relative to your hand play an important part.

APC examined trackballs from Microsoft and Logitech. Microsoft's Trackball Optical (www.microsoft.com.au, $99.95) places the ball in the middle of the unit on the left-hand side. This presumes that you move the ball around with your thumb, which may not suit all hand sizes. Certainly, smaller hands would have a harder time (and require more arm and wrist-shifting movement) accommodating the buttons, wheel and trackball. Thumbs are excellent for left-right grasping actions, but not so good for up-down movement, and to operate the trackball fully, you need to have both ranges of movement at all times. Also, the curved arch of the trackball unit makes for a rather awkward wrist extension position.

Microsoft's Trackball Explorer ($159.95) has four mouse buttons and a standard scrolling wheel. The position of the scroll wheel is handy, but it undoes some of the ergonomic benefit of the trackball, as it's an invitation to overextend the wrist.

Logitech's Cordless TrackMan FX (www.logitech.com) provides a superior ergonomic device for $189. The trackball is positioned at the front of a relatively short body, which promotes the use of the fingertips to control it. A small window on the side also provides the option of operating it with your thumb, but as with the Optical Trackball, this quickly becomes uncomfortable. Positioning of the TrackMan FX is important and is aided by the snap-on wrist guide, which can swivel about 30°, depending on where you have the trackball positioned. The wrist guide isn't a wrist rest; instead, it coaxes the hand and wrist into a relatively neutral position. Less impressive is the button placement, which feels a little odd when used for a long period of time. The buttons are quite small for a trackball, which won't suit everyone.

Some people find trackballs all but impossible to use, and prefer the common mouse. There are also alternatives to standard mice and trackballs. *APC* recently examined the 3M Renaissance Mouse, a joystick-shaped ball mouse that promotes itself as being ergonomic (see *APC* January, page 38). It comes in two sizes and colours: a larger black stick and a smaller white one. Initially, it can be painful to use, as most people have poor mouse habits. An important disadvantage is that it only comes in a right-handed configuration.

should just ensure that their employees (including contractors) are comfortably adjusted to their workstation," he said. Half the claims he deals with are from the insurance companies of employers and half are from solicitors representing workers with injuries related to computer use. Over the last 10 years, he has been involved in 2,000 claims in this field.

In some cases, people spent thousands of dollars on new equipment, but did not use it properly. Other cases were caused by flickering displays and otherwise poorly maintained equipment.

Employers have a legal obligation to protect their workers from injury. "Many employers are ignorant of their statutory obligations to audit their workplace for activities where there is exposure to strain injury," he said. There are state and federal laws that require employers to create a safe working environment. "Employers should train and monitor their employees for early warning signs and symptoms of strain caused by overuse," he said.

The work culture of the information economy is extremely competitive and sometimes employers and markets place unrealistic expectations on employees

Dohrmann is disappointed that the incidence of computer-related injury does not seem to be improving. This is despite a growing awareness of the problem and greater access to ergonomic information and products. "A lot of small and medium-sized companies don't understand their obligations," he said. Employers are obliged to consult their employees about their working conditions. "Equipment has to fit the people and employers should have a work system that provides fair breaks," he said.

However, many workers suffer in silence. "There is often fear among staff about reporting early symptoms," he said. Dohrmann has been practising for 20 years and has witnessed first-hand the proliferation of PC-related injuries in the workforce. "There has certainly been a great increase. When PCs were first introduced into workplaces, there was a jump in strain injuries. This quietened down as people became better trained," he said.

Culture shock

The rise of the PC and the Internet has resulted in an epidemic of PC injuries, as the footsoldiers of the information economy spend more time using technology. The slow yet insidious creation of an army of walking wounded is likely to become more apparent as the current generation of younger workers hit middle age.

Janet Bezner, a physiotherapist and head of ergonomic software provider PeakCare, puts the blame squarely on a work culture that places too much emphasis on spending time staring at a computer screen. According to Bezner, the latest and greatest 'ergonomic' equipment will not save you from hurting yourself if you overuse your PC. "You can only do so much with equipment — you still need a break," she said.

The work culture of the information economy is extremely competitive and sometimes employers and markets place unrealistic expectations on employees. "If people are seen as not working, then they are labelled as slackers. Employers need to set the tone in the workplace," she said. "In my opinion, it is the employers' responsibility to make available the tools to allow employees to take breaks. And when I say breaks, I don't mean 20 minutes every hour — we're talking 20-second micro-breaks."

Even when employers appear to fulfill their legal obligations and pay lip service to preventing injury by encouraging employees to take breaks, many still pile on unrealistic workloads. "My suspicion is that people think they may lose their jobs or get reassigned — it goes back to the culture. It is up to the employer not to take retribution or place a stigma on taking breaks," Bezner said.

Now the growth of portable and wireless devices is creating a new uncertainty for workers and employers. According to Bezner, laptops are better in some ways; they are more flexible and you can move around more easily, instead of being stuck in one position. "On the other hand, you can never get away from it," she said. Workers may be tempted to work even more if they can't leave work behind. "You have to heed the same lessons," she said.

Bezner said there is a new urgency in the US to force employers to carry the burden of PC-related injuries. Employers are fighting the move, arguing that employees are using their PCs outside of work and this places the problem out of their jurisdiction. The lines between work and play are increasingly blurred in the

Ergonomic keyboards

In the past, any slab of cheap plastic was thought adequate for a keyboard, but keyboards are no longer a PC afterthought. Most keyboards now come with a wrist rest or can have a plastic wrist rest fitted to the front of the unit. This is intended to support your wrists and the heel of your palm between keystrokes, and is not designed as a permanent support while typing.

Manufacturers such as Goldtouch, Comfort Keyboards and Kinesis produce keyboards suited to people with specific ailments including arthritis and some muscular disorders.

However, the most significant ergonomic improvement on the conventional keyboard layout is the split design. Split keyboards encourage your hands to adopt a more natural position than is required by a flat keyboard. Changing from a flat board involves practice and patience, especially if you're already an accomplished touch typist.

Microsoft has a range of keyboards based on a split design. The top of the range is the Natural Keyboard Pro (www.microsoft.com.au), which costs $119.

APC encountered a small glitch when the keyboard was plugged into the test PC's USB port, alongside Microsoft's USB IntelliMouse. Windows dutifully started searching for the drivers, then froze both mouse and keyboard, making it impossible to hit Next to continue the installation. The problem was solved by swapping the keyboard back to the round PS/2 socket, but this isn't ideal for USB users.



An array of dedicated keys and buttons are positioned along the top of the keyboard. These activate your Web browser and email software, play music and access common Windows functions such as My Computer and the Calculator.

Perseverance is the key to success with the Natural Keyboard Pro. At first, the layout is very hard to fathom, and the bigger keys towards the centre of the split tend to dominate your typing, but after a day or so of practice, things start to come together. Most of the extended keysets are where you'd expect them, but the function key row has been made half its normal size to keep the typing angle consistent.

The front of the Natural Keyboard extends towards you to form a generous wrist rest area. This would suit some people, but may impede others.

Logitech's Cordless Freedom Pro package (www.logitech.com, $259.95) comprises a split keyboard and a shapely mouse, both of which are cordless. A small transmitter/receiver module plugs into the USB or PS/2 ports at the rear of your PC. To get the mouse and keyboard working, you need two free USB ports, which on most PCs means all of them. You need to start with your existing keyboard already plugged in, because the install process involves a reboot, and the system will complain at that point about having no keyboard or mouse connected.

The contoured shape of the mouse is more suited to smaller hands. Long fingers tend to overshoot the mouse buttons, forcing you to hold the mouse in a slightly cramped manner. The scroll wheel is practical, but it isn't so good from an ergonomic standpoint because it forces the fingers into a contracted position and encourages repetitive motions, especially when you're scrolling through a long document or Web page.

The keyboard is pleasant to use, but lower priority keys are arranged in an unusual way. For example, if you like to use the insert/delete and page keys, it takes some getting used to. The cursor keys are a reasonable size, but the Freedom Pro is still unsuitable for gaming purposes; standard keys such as Ctrl and Alt are very small and in odd locations if you're centring on the cursor keys.

The Cordless Freedom Pro's lack of wires presents an ergonomic quandary. It gives you freedom in the way you manipulate objects, but it encourages you to perch the keyboard on the edge of the desk or place it in other ergonomically unsuitable positions. The poor posture and hand position that could result from this would undo the benefits of having an ergonomic mouse and keyboard.

technology arena. Dohrmann deals with this issue in many of his cases, and says that in each case, a person's habits are closely examined.

Even if you escape injury, if your workplace is not safe and a co-worker ends up being hurt, you could be called on to describe your working conditions in court. Dohrmann often subpoenas co-workers (and former co-workers) to testify about their working conditions. "They can be scared and may want to keep quiet, but it is always an option for us to call them," he said.

He also warns that these cases "are not normally difficult to prove". Penalties for strains caused by overuse range from $120,000 to $150,000. "We examine the workplace, the rate of work and super-vision, and decide whether the work made a substantial contribution to the injury." So, in the end, putting workers' noses to a PC grindstone is not worth it, in terms of either the financial or the human toll.

Risky business

Setting up an ergonomic workstation (at work and at home) is vital if you want to stay healthy and connected to the information economy. However, there are no standards that formally classify products as 'ergonomic'. There are thousands of products on the market that claim to be ergonomic, but how can you tell which ones will help you?

Bezner said one of the major reasons ergonomic equipment is ineffective is that it is not fitted to each person's unique circumstances. "People need to be able to try things and see what works for them," she said. Some retailers rent equipment or have showrooms where people can try products before spending hundreds or even thousands of dollars for supposedly 'healthy' PC equipment.

For Bezner, ergonomics is all about prevention. Even the most ergonomically designed equipment will not help you if you do not vary what you are doing. PC users must learn what their bodies can cope with and balance this with hardware that is suited to them so they can continue to surf the Internet well into old age.

Recent software is also bringing ergonomics into the PC. Some programs force you to stop working after a certain period of time or after a specified number of keystrokes or mouse-clicks. Used in conjunction with the right mouse and keyboard, these programs allow PC users to combat the worst injuries.

Ergonomic software

If you can't remember to stretch at your PC, why not get your PC to do your thinking for you?

Ergonomic software has come a long way since the first unpopular egg-timer applications started generating repetitive pop-up boxes that warned you to stretch or check your posture.

Magnitude Information Systems claims that ErgoSentry 4 (www.magnitude.com) can 'coach' you into adopting good computing habits. The program alerts you if your rate of keyboard or mouse activity reaches a certain level. A gauge that looks like a graphic equaliser on a stereo appears in the taskbar, rising and falling depending on how fast you type and click your mouse. ErgoSentry makes a polite pinging noise and the gauge flashes when it's time to rest your hands or stretch. ErgoSentry adjusts to your usage patterns, so if you are already taking breaks or you leave your PC, you will not be alerted. The program sends a general alert if you have been using your computer at a lower rate for an extended period. The idea is that you start to receive fewer and fewer alerts as you become accustomed to taking breaks. Eventually, you should start doing it independently, so it is worth the 15-day trial.

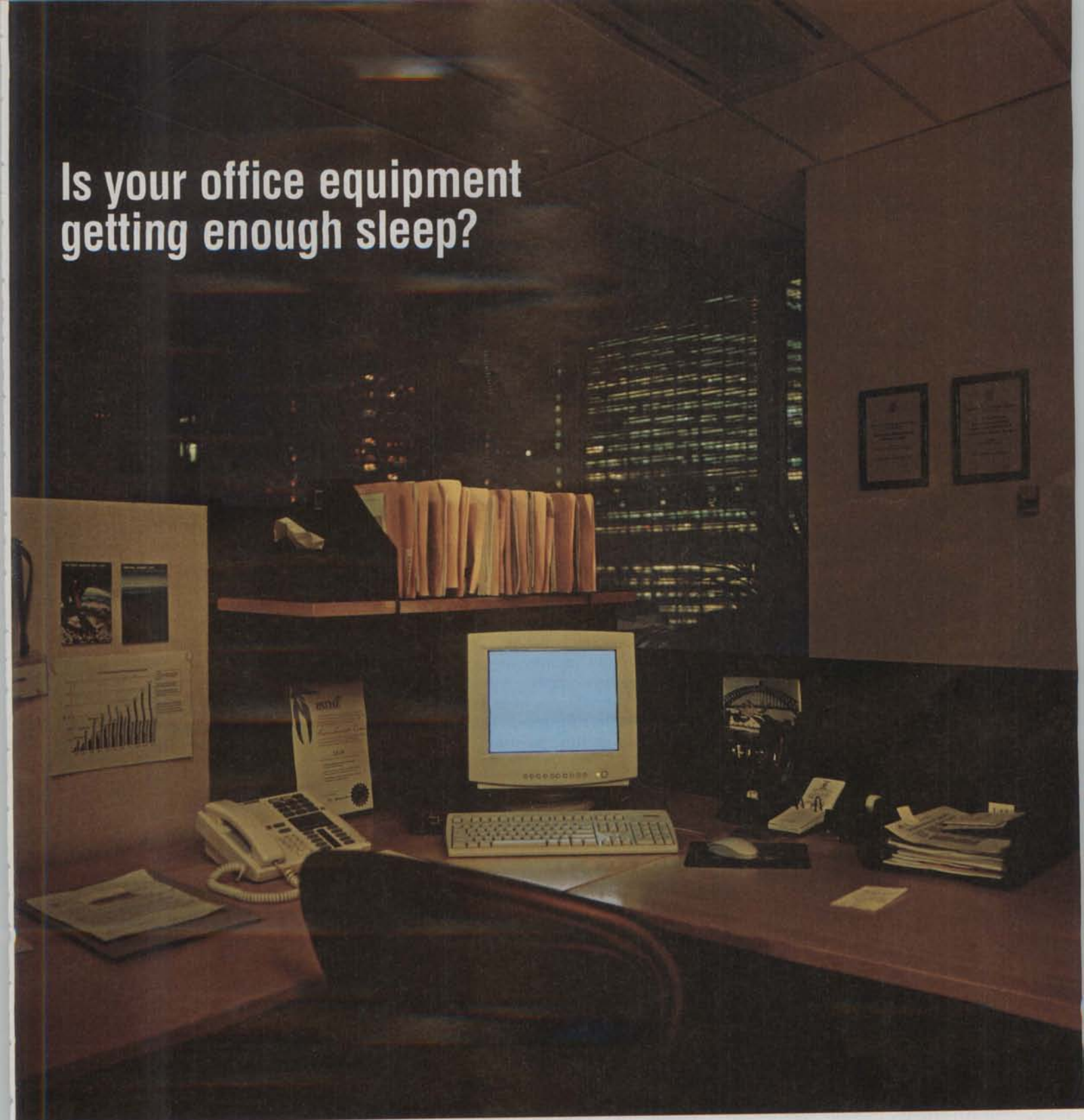


▲ Ergonomic software can be a lifesaver or an irritant.

If you want to get a general picture of your PC habits, there are a number of excellent applications available. The most self-explanatory application, MouseCount 1.1 (www.kittyfeet.com/mousecount.htm) counts the number of times you click your mouse. A table shows you the number of clicks you make each day, week, month and year. It records percentage increases or decreases in clicks from the previous day. You can also create individual sessions to measure the number of mouse-clicks you make during a specific task. This tiny 34K shareware download claims to be "useful in computer addiction studies", as well as in ergonomic assessments. Even if you only use MouseCount for a week, it will open your eyes to your computing habits.

OmniQuad Desktop Surveillance Personal Edition (www.omniquad.com) is a devilish little surveillance program that will strike fear into the heart of anyone who uses a network or shares a PC. OmniQuad creates detailed logs of *everything* you do on your PC. When OmniQuad is active, an eye stares at you from the taskbar, quietly recording all the Web sites you visit, all the applications and documents you use, and all the emails you send. OmniQuad has a 'virtual' recording option, so you can review in tedious detail every action you've performed on the PC. OmniQuad also keeps a separate text log (viewed in Windows Notepad or Microsoft Excel) that records an exhaustive list of all your activities, accumulating massive amounts of data. OmniQuad supports multiple user profiles and records data on different users according to how they log on to the PC. The program even allows the logs to be sent to an email address or a server — so they can be used against you in a court of law. The software has security protection, so one person can secretly monitor the activities of other users — at least for the 15-day trial period.

StretchWare 1.0.7 (www.shelterpub.com) is a good example of an ergonomic software package that is less than successful. StretchWare allows you to program a limited stretching routine into your PC. A small figure in the Windows taskbar starts moving its arms when it is time to stretch. You can configure the alerts, but if you use headphones or vary the volume on your PC for any reason, take care — the sound is intentionally loud and obnoxious. The alerts often fail to match your rate of PC activity and tend to appear at inconvenient moments, such as a few minutes after you have been away from your PC. The alert includes a series of instructive drawings showing a variety of stretches. However, the drawings are little more than those typically seen on the walls of computer labs, so even the 30-day trial is not really worth it.



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Corporate briefs

Sun eases up on Java

One of the most infamous security features in Java is its 'sandbox' model, which restricts access to storage areas of a computer to minimise the chances of infiltration by rogue applications and viruses. This may be in for a shake-up. There are plans to extend Java further into the world of embedded systems development by allowing applets to write directly to memory, something the traditional Java model doesn't allow. However, such behaviour is common in embedded systems, where direct addressing of memory helps to cut down on the size of code in devices that often have only tiny amounts of memory.

SGI reaches 512 processor milestone

Looking for some extra multiprocessing grunt? NASA has begun operating the first functional 512-processor system from SGI, and is hoping to have a 1,024-processor system in the testing stage by June. The Irix-based Origin 3800 system utilises SGI's nonuniform memory access (NUMA) technology to overcome the problems associated with an OS that spans such a large number of processors. Previous models have had to run multiple OSes at once, restricting calculation flexibility. The Origin 3800 will be used for a variety of research tasks, including hurricane simulation and airflow calculations for large aircraft.

Web hosting set to boom

Despite the ongoing woes of the dot com business world, one online business sector isn't showing any signs of slowing down. The Web hosting market is set to top $US46.9 billion by 2006, up from $US10.3 billion in 2001, according to a study by research firm Ovum. Much of that growth is due to the low use of hosting services in most areas; only 14% of companies that currently have their own site use an external hosting provider, but the figure is higher in Western Europe. The market is expected to grow by over 60% in the next year alone.

Insuring B2B

For many businesses, information technology is a form of insurance. Most companies invest heavily in IT to remain competitive and introduce innovations that lower costs or improve profitability. However, has the insurance industry adopted information technology to the same degree?

Insurance@Risk, a recent report from the National Office for the Information Economy (NOIE), suggests that insurers have been quick to use IT for standard backroom processes, but haven't shown the same enthusiasm for business-to-business (B2B) transactions. "While the financial services sector has been an early adopter of Internet ecommerce, the insurance sector has been slower to take advantage of opportunities presented by this medium, with many processes still remaining paper-based," the report notes.

Insurance accounts for 2% of GDP and realised $3.3 billion in profits after tax in 1998/99. Insurers are under constant pressure to improve returns in the sector, so their reticence when it comes to IT is a little surprising. The report acknowledges this, pointing out that "Efficiencies can be created in an electronic system to reduce turnaround times and improve communication processes between relevant players. Improvements in these areas can reduce costs and increase service levels to consumers."

As the chart below shows, Net-based systems cost less than one-tenth of conventional approaches, so these savings could be significant. The key conclusion NOIE drew was that B2B efficiencies are most likely to be created if industry-wide standards for insurance processes are agreed on. These will ensure easy exchange of information between insurers and other financial services bodies.

Angus Kidman

Insurance costs

Methodology	Admin cost per $ of premium received
Traditional	25–30 cents
Call centre	11–12 cents
Internet based	2.5 cents

Source: *Insurance@Risk*, NOIE

This month's buzzword: Cyberdefence



Why do we need this word?

Most corporations are completely (and justifiably) obsessed with protecting their internal and external information systems from unwanted intrusions, hacks and leaks, so there's a constant demand for terminology in this area. The media's seemingly insatiable appetite for stories portraying computer security breaches also contributes to the demand by ensuring that any term gets a good workout once it appears. With its warfare connotations, 'cyberdefence' is a natural for describing information security mechanisms.

What does it mean?

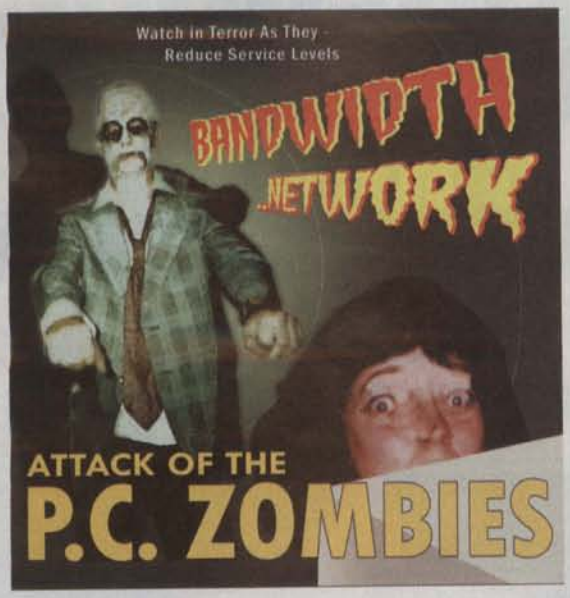
Almost exactly what it says: any technology or system that can be used to protect resources within a networked (and usually Internet-connected) environment. This includes technologies such as firewalls, but also the policies and procedures that support them.

Not surprisingly, the term is most commonly encountered in military or pseudo-military contexts; for example, the Pentagon and the FBI seem particularly fond of it. It's also being increasingly used in other areas, perhaps because it invokes a more specific image than more mundane terms such as 'network security' or 'antihacking'. Avoiding the term 'hacking' also saves those endless arguments over whether hacking is inherently wrong.

Where should I use it?

Anytime you like, but please remember that the correct Australian spelling is 'cyberdefence', not 'cyberdefense' (the US spelling). Throwing a sentence such as 'We need to make much more significant investments in a range of cyberdefense initiatives' into a report may just result in your manager purchasing you the *Macquarie Dictionary* — a fine resource, but one that won't do much to protect your network from intruders. (This may be assuming an uncommon degree of literacy on the part of your manager.)

Service denied



As companies such as Yahoo, eBay and St George Bank are only too painfully aware, Distributed Denial of Service (DDoS) attacks can be extremely effective.

A DDoS attack is an attempt to deny legitimate users access to a facility (most often a Web site) by overloading it with bogus requests. It doesn't matter whether it's the server or the communication channel that is swamped, the effect is the same. No visitors means no revenue, and an attack can also affect return visits and the company's reputation.

DDoS is often an end in itself, but it can also be a cover for another attack. According to Greg McPhee, strategic accounts network engineer at security vendor Top Layer Networks, it's possible to slip past a firewall while a DDoS attack is in progress.

If the PCs on your network are turned into zombies as part of a DDoS attack (see 'How DDoS works' below), you have two problems. First, when the attack occurs, your network bandwidth and CPU cycles are consumed, reducing service levels and increasing operating costs. Second, McPhee warns that the owners of zombies involved in an attack can be financially liable to the victim if they didn't take reasonable precautions.

Steve White, principal of White SW Computer Law (a Melbourne-based practice specialising in IT litigation), confirmed that this possibility exists under Australian law. According to White, liability can be enforced where negligence results in loss or damage to another in circumstances that were foreseeable and not remote.

White believes that a victim might also have a case against their ISP, on the grounds that the ISP should have had a mechanism in place to stop such attacks reaching customers. However, he warned that this responsibility could be removed by a clause in the contract.

So, how can DDoS attacks be blocked? If everyone 'locks their front door' with a firewall and makes sure all security-related software updates are promptly applied, recruiting zombies is a lot harder.

ISPs can install products that examine packets as they enter and leave the Internet backbone. Arbor Networks, Asta Networks and Mazu Networks each have or are developing a product that analyses the traffic to identify attacks in progress. Top Layer's hardware device AppSwitch works at gigabit speeds to block known DDoS patterns whether the packets are inbound or outbound. This protects the company's systems and reduces the risk of liability for attacks on others.

As with most security issues, there's no magic bullet. Layered defences and sensible policies appear to offer the best protection.

Stephen Withers

How DDoS works

In a DDoS attack, the perpetrator uses a network of computers (called 'zombies') to attack the target simultaneously. This increases the intensity of an attack and makes it harder to trace and control the source. The size of the attacking network depends on the processing capability and bandwidth of the victim as well as that of each zombie. Twenty zombies could swamp a small server on a single ISDN line, but a cluster of servers with heavy-duty connectivity might be faced by thousands or potentially tens of thousands of attackers.

The perpetrator's first step is to identify potential zombies. Port scanning tools quickly and easily show what software is running on a particular computer, and readily available scripts check whether known exploits for that platform are still available. As soon as a vulnerable computer is identified, the perpetrator can use a variety of tools and techniques to compromise the system, install the zombie software and cover the tracks. Over time, the perpetrator builds up a network of zombies that can be called into action.

The 'master' system forwards commands to the zombies. Prior to the attack, the perpetrator tells the master what to attack, when and for how long. At the appointed time, the master activates the zombies and the attack begins. To find the culprit, the victim must trace packets back to one or more zombies, and from the zombie to the master, and then try to determine who subverted the master. As this probably occurred weeks or months earlier, the chances of finding the perpetrator aren't good, even with the full cooperation of the owners of each system.

Unlike the zombies, the master doesn't need to provide much bandwidth to be successful, as each command only needs to be a few bytes. It's more important that the system has high availability and is busy, so the extra IP packets are less likely to be noticed. Domain name servers for ISPs fit this description, and have been used for this purpose.

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Patch Panel

The Patch Panel section on CD 1 of *APC*'s cover CD pack includes the latest patches and updates for a wide range of operating systems and applications. Check page 185 for details.

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The upgrade dilemma

It seems like you just get everyone's desktops running smoothly, and the next update is released. Is it better to skip a version and stay with the one you have? What are the risks of sticking with an OS when it is no longer being supported? **Paul Zucker** *examines the dilemma of operating system upgrades for IS managers.*



There's no such thing as a 'standard office PC'. Despite the best endeavours of IS managers to keep things simple and relatively foolproof, every organisation ends up with its own blend of hardware, operating systems and applications on the desktop. As if it isn't difficult enough to get these components to work together reliably, nothing stands still in the world of PCs. Products are constantly being upgraded and managers are tempted with lavish promises of must-have new features and infinitely better productivity.

The problem of software upgrades applies to both applications and operating system software. However, OS upgrades present the greatest challenges to businesses because the changes they introduce are more radical — and it's a challenge they face at regular intervals. Microsoft comes out with a new version of its desktop operating systems every couple of years, and since the release of Windows 95, it has provided business with a choice of either Windows NT/2000 or one of the consumer products on the desktop. Mac OS undergoes upgrades at a similar rate, and Linux is updated even more frequently.

Even companies who don't wish to switch their core operating system often need to implement service packs and other bug fixes. This can sometimes add extra functions to the system, but it's more commonly a case of eliminating security flaws or major problems that can render individual PCs or entire networks useless.

Corporate trends

The accompanying chart ('Desktop OSes in corporate Australia') of the relative penetration of operating systems on corporate desktops in Australia, as measured by IDC, shows some surprising results.

Desktop OSes in corporate Australia

Windows 95	34.5%
Windows NT Workstation	31%
Windows 98	22%
Windows 2000	6.7%
Mac OS	2.1%
Others (OS/2, Windows 3.1)	1.8%
Unix	1.7%
Linux	0.2%

Source: IDC Forecast for Management Survey, 2001

Dell moves to Windows 2000

PC manufacturer Dell is an example of a corporate user that has embraced Windows 2000 and moved almost entirely away from Windows 98. In the US, Dell has migrated completely to Windows 2000, and in Australia it is halfway through the process. "We focused on servers first, then notebooks, and finally we're doing the desktops," Dell Australia IT manager Brent Rutherford said.

As is often the case with staged migrations, the process has resulted in different levels of user satisfaction. "As a user of a new Dell notebook running Windows 2000, I can tell you that it's a much nicer environment for a notebook, as its plug-and-play capabilities are superb," Rutherford said. "Our desktop users are in our call centre, and there's little advantage to running Windows 2000 until the server migration is complete. Only then will they realise speed improvements and our IT team will take advantage of the enhanced functionality and security of the operating environment."

Rutherford said that there was "a fair amount of planning required" for the migration. "Our IT team has undergone self-education and attended several courses. A prior knowledge of NT was desirable, but not mandatory, as Windows 2000 is an entirely new operating environment." The company experienced no compatibility problems with any of the existing software or hardware — it just migrated to the new OS and kept working. "Even if we didn't have all the migration resources we need within Dell, we'd still be able to find everything on Microsoft's Web site," Rutherford said. "I can't sing its praises highly enough."

Windows 2000 still suffers from a reputation as an untested platform for large corporate systems, but Rutherford believes that this reputation is undeserved. "Remember, as a global company we do around $US50 million in business every day," he said. "To do that, we rely on our own Dell hardware and Microsoft's operating systems. We wouldn't have made the move if we didn't think it was the right one."

Product life cycle guidelines



▲Microsoft now specifies a lifespan for its OSes.

More than half of all corporate desktops use either Windows 95 or Windows 98, and just over one-third use Windows NT or 2000. The remaining 6% comprises competing systems such as Mac OS and Unix.

Corporate users are consistently conservative in their response to newly released OSes. For instance, in the end-of-year survey following the release of Windows 95, only 4% of corporate desktops were running it. For Windows 98, the figure was 5.7%, while for Windows 2000 it was 6.7%. These numbers suggest that Windows 2000 had the highest rate of adoption in its first year, but they can't be compared directly, because they were released at different times of the year. Windows 2000 had been available for the longest period, followed by Windows 98 and then Windows 95.

Peter Hind, IDC's end user program manager in Australia, said that corporate adoption of new desktop operating systems is much slower than most people assume. "A typical desktop investment is for three years — that's the hardware and the operating system — and most corporate users tend to keep things going with as little change as possible during that period," he told *APC*. That trend is also evident in many other studies of corporate OS purchasing, which demonstrate an ongoing dominance by Windows, but haven't yet detected major shifts to the latest desktop platforms (see 'Measuring the OS market', page 121).

"Many companies made their move in the period running up to Y2K, so they're still within that life cycle," Hind said. "That's one of the reasons Windows 2000 has been so slow to take off, despite its obvious advantages."

Microsoft wants to see businesses move from the older Windows platforms to Windows 2000, and frequently calls on its business partners to promote the benefits of the shift (see 'Dell moves to Windows 2000'). Windows 2000 has demonstrable management and stability advantages, but Microsoft's motivation is more basic: it makes money when you buy the new version of its product, not when you keep using the old one.

Best consumed by . . .

Demonstrating that point, Microsoft unveiled a new policy earlier this year. The Windows Desktop Product Lifecycle Guidelines specify how long Microsoft plans to sell its products for, and how long support will be available for them. The complete policy can be found at www.microsoft.com/windows/lifecycle.asp.

Underneath the legalese, the guidelines' basic message is quite simple. Products are designed to have a three-year life. During that time, they can be bought from Microsoft or hardware manufacturers and all the standard support options are available. During the fourth year and into the fifth year, they can only be bought as OEM versions from the manufacturer and the support options change. After five years, all support and availability ceases.

How does this affect existing operating systems? Windows 95 was effectively discontinued at the end of 2000, and Windows 98 and 98 SE, as well as Windows NT, will be discontinued at the end of June 2002. More pressingly for corporate users, support will cease at the end of this year for MS-DOS, Windows 3.1 and Windows 95.

One of the more contentious aspects of the guidelines is the 'downgrade licence'. For instance, if a business has an ongoing need for Windows 95 after June this year, Microsoft won't sell it new licences for the OS. However, if it purchases a licence for Windows 2000, it is allowed to 'downgrade' that licence and install a copy of Windows 95 instead. If the business is planning a migration to Windows 2000 anyway, this will be cheaper in the long run, but in the short term, you pay more for the licence than for Windows 95 alone.

Microsoft generally allows hardware manufacturers to continue selling its old operating systems for some time after it drops the retail versions. However, almost all of them have dropped Windows 95 from their catalogues, and Windows 98 is also starting to disappear. The same logic applies to business systems. For example, Dell recommends Windows 2000 Professional for business use, but will still supply NT 4.0 (or Linux) if customers request it.

Of course, none of this necessarily means that companies move with the same speed. With working systems already in place, many businesses are understandably reluctant to upgrade if there is a risk of failure. This is a phenomenon that extends beyond

operating systems into the hardware area (see 'The devil you know', page 122).

Moving towards XP

Windows 95 is still used far more widely throughout the business world than Windows 2000. Consequently, the release of Windows XP (see 'Great XPectations', page 94) is likely to result in a renewed effort by Microsoft to encourage companies that have resisted the change to Windows 2000 to upgrade to XP. XP aims to combine the user friendliness of Windows 95 and 98 with some of the new features of Windows 2000.

Microsoft Australia's Windows product manager Paul Roworth said that there is a strong case for companies to upgrade to Windows XP, but added that each business needs to conduct its own evaluation. "You need to be able to see rapid economic justification for an upgrade like this, and I can see particularly that companies that skipped Windows 2000 will find this justification," he told *APC*.

"Those who are running 2000 already may well find that they can't justify the



▲ Paul Roworth, Microsoft Australia's Windows product manager

move to XP Professional right away. There's an inherent cost in changing the desktop, so the improvement has to be marked in order to make it worthwhile." He added that through programs like Microsoft TechNet and the widespread beta program, most companies would have tried XP already and have some idea of its usefulness.

The notion of widespread beta trials underlines a new complication in the upgrading process. Beta versions of software used to be quite rare. Only selected companies were invited to try software before its general release, but in return they were given comprehensive support. Now, the beta versions are so freely distributed (albeit with minimal support) that they are more like a soft release for the product. Often, so many people try the software at

Measuring the OS market

As the figures for Australian uptake quoted earlier in this article (see 'Desktop OSes in corporate Australia', page 119) demonstrate, Windows remains the dominant force in corporate desktop OSes. This is even more clearly demonstrated with global market share figures. However, the news isn't all good for Microsoft's development team.

In 2000, according to IDC, Microsoft accounted for a whopping 92% of shipments into what the research company refers to as the client operating environment (COE), otherwise known as the desktop. In the more tightly contested server market, Microsoft accounted for 41% of shipments. "In what could have easily been a tough year for Microsoft, because of its transition to Windows 2000, the company managed to increase its position in both the client and the server operating environments market," IDC research vice-president Dan Kusnetzky said.



However, in terms of market growth, the story is rather more varied. In the server environment, shipments grew by 20%, well ahead of the overall market growth of 13%. That didn't make Windows the fastest-growing server environment; that honour fell to Linux, which grew by 24%.

In the desktop environment, Windows and Linux were again the only products to increase sales. For Windows, growth came largely from Windows 98, which was up by 36%, with Windows 95 almost disappearing (a strategy Microsoft has keenly encouraged). Overall, Microsoft's desktop shipments increased by just 8%, a reflection of the mature state of the market and the lack of heavy competition. Despite posting good growth numbers, Linux remains a minor player, accounting for only 2% of desktop shipments.

"The general trend for client operating environments continues to be consolidation around 32-bit operating systems and applications," Kusnetzky said. "Unfortunately for competitors of Microsoft, this consolidation also means a general movement towards Windows."

The shift to Windows isn't necessarily good news, even for the companies that embrace it. The workstation market has significantly moved away from Unix variants towards Windows NT and 2000. Volumes have increased from that transition, but it has been at the expense of profit margins.

According to research by Gartner subdivision Dataquest, total revenue for the workstation market dropped by 13% to $US8.6 million in 2000. This was despite shipments being up considerably, topping 1.6 million units in 2000 — an increase of 11%.

"Aggressive growth of the Intel/NT workstation market and convergence of the technologies has led to a blurred distinction between PCs and workstations," Gartner chief workstation analyst Pia Rieppo said. "Navigating this no-man's-land will be the biggest challenge the workstation vendors face in the near future."

The same problem has yet to manifest in the server market, which is also increasingly shifting to commodity hardware built around Intel processors and Windows networking, but where strong competition still exists from other players. According to Gartner's analysis, revenue for the server market grew by 11% to $US53.8 billion. "We are not yet seeing the effects of an economic slowdown on the server market, and competition is continuing to heat up as the market matures," principal server analyst Jeffrey Hewitt said.

Notably, the first four of the top five manufacturers in the server market — IBM, Sun, Compaq and Hewlett-Packard — are not entirely dependent on Windows-based servers for their revenue. IBM, which took out the top position despite flat growth, offers a combination of Windows, Unix and AS/400 systems. Compaq (placed third) and Hewlett-Packard (placed fourth) offer both Windows and their own proprietary Unix systems, and Sun (ranked second) doesn't use Windows at all.

That said, the strongest growth rate in the server market was for Dell, which operates largely as a Windows-only shop. Placing fifth in global sales, Dell saw 73% growth year on year in its server shipments.

The devil you know

The office laser printer market is huge — just ask Hewlett-Packard. In the 16 or so years since the first generation of its LaserJet printers, the company has released dozens of models, each hopefully better than the one it replaces. So why is it that many users panic when they hear of a model becoming obsolete, and rush out to buy up any they can find?

This behaviour isn't as strange as it seems. Consider these points.

- The model is a known product which does the job.
- The company has standardised it as a workgroup printer, so only one driver is needed on every end-user PC.



- The company only needs to stock one type of toner cartridge. This means that there is little chance of a replacement not being available and stock costs are kept down.
- Any problems using the printer with the company's applications have long since been solved.
- Everyone is used to the way it works, so the advantages of a new model seem less relevant.

Hewlett-Packard finds itself in an unusual position. It would like to sell more new printers, but even an old printer needs replacement toner cartridges, and that's where the real profit comes from anyway. However, even Hewlett-Packard will reach a point where it chooses not to keep making spares for old models, so the user has to bite the bullet and buy a new model.

home first that there is a marked pull-through effect as they lobby their IT department for full corporate introduction of the new software.

There are still many companies that won't have sampled new OSes prior to their introduction. One good source of advice in such cases is the support department of your main hardware manufacturer. It's likely that they will have spent months running the various beta versions of XP (or Whistler, as it was called earlier) and are aware of potential problems, such as drivers not being available yet, or BIOS upgrades being required. Such advice should be taken cautiously — after all, hardware vendors make money through selling more equipment, and most OS upgrades demand hardware upgrades — but you can pick up some useful information.



▲ Novell's ZENworks is a comprehensive network software upgrade product.

Automated updates

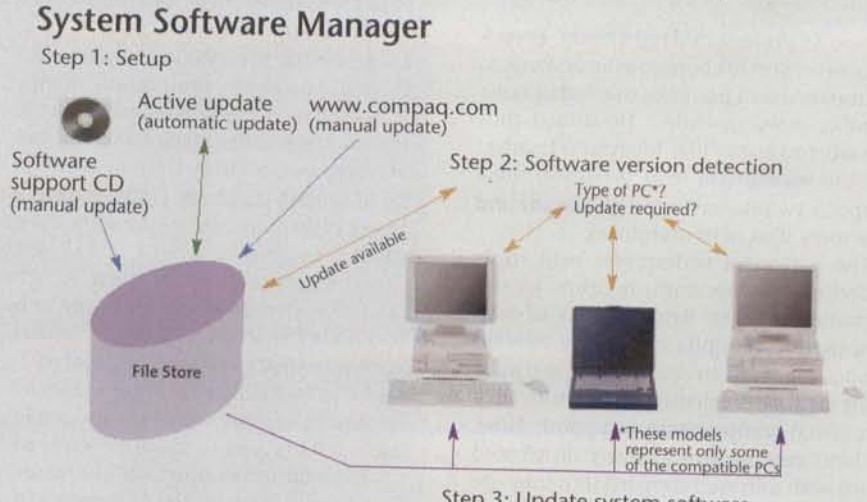
Software and hardware manufacturers recognise that spending the weekend updating user workstations isn't all that appealing, so they have increasingly turned their attention to ways of automating the process. The solutions range from simple scripting programs that load new drivers right up to completely automatic regimes for rolling out whole new versions of software.

It is often worth checking with your PC supplier to see what sort of roll-out application is available, especially if you only need an interim upgrade. For instance, Compaq has a product called System Software Manager that is capable of rolling out certain updates to workstations automatically.

Novell's ZENworks is a much more comprehensive product that controls the full implementation of software on a network. As well as rolling out new versions of software to existing users, managers can set up new users with ZEN (Zero Effort Networking). The administrator only needs to assign permissions to the user, then the software is loaded on to their remote PC. An added advantage is that it quickly allows you to configure any PC on the network with a user's requirements, such as when a PC is replaced or the user relocates. ZENworks uses Novell's Directory Services to store the user permissions and profile. ZENworks Server can also control the speed and timing of updates so that normal network traffic is not affected.

As well as a range of remote deployment tools, Microsoft has the User State Migration Tool, which checks end user systems to see how well they will cope with a migration to a new operating system. A Windows 2000 version already exists, and a Windows XP Professional version is expected.

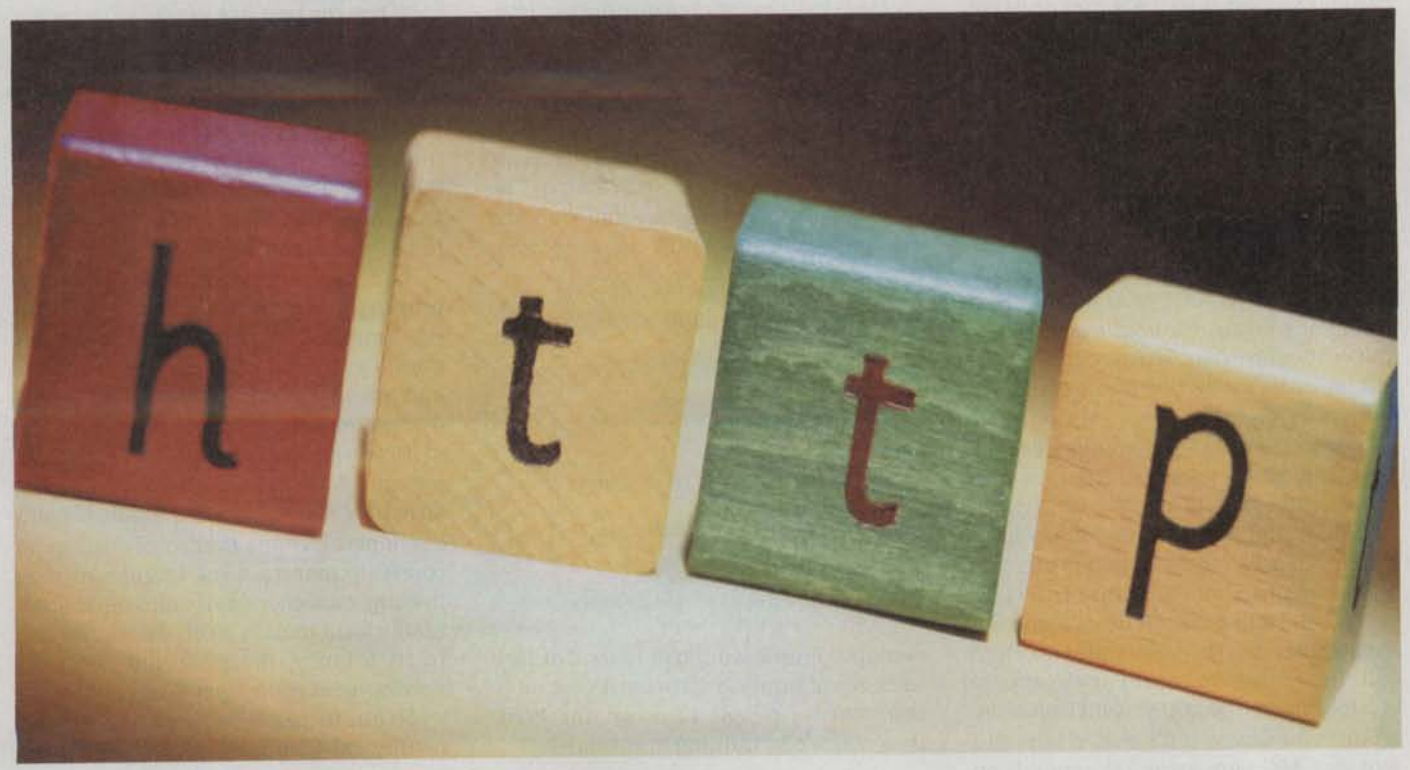
Settings that can be migrated using the tool include dialup networking and remote access service settings, desktop display and accessibility options, mapped drives and network printers, email details, My Documents folders and Internet Explorer configuration. The tool can be customised to include or ignore various file types, folders, registry keys, or even registry trees. However, there are restrictions: it doesn't migrate drivers, dynamic link libraries, synchronisation files or applications, but it can migrate some application settings.



▲ How Compaq's System Software Manager works

Still a lot to learn

Despite the hype, few Australian companies are taking advantage of Net-based training systems. What's holding them up, and what will the future bring? ***David Braue*** *investigates.*



Businesses are moving confidently into the brave new world of ebusiness and customer-driven strategies. However, most are still in the Stone Age when it comes to improving their staff members' knowledge economy skills. Despite years of technological progress in computer-based communications, corporate training is still dominated by the 'fly 'em in and sit 'em in front of a whiteboard' approach. This method is costly, and study after study into how much people retain has shown that it doesn't work particularly well.

It's said that most students forget up to two-thirds of what they learn in a classroom within a month of finishing the course. Online learning, or elearning as it's now called, could change this by providing personalised and more engaging learning experiences. In a recent survey of elearning participants, US investment bank WR Hambrecht found that elearning increases retention by between 25% and 60%.

According to Oscar Alban, principal market consultant with call centre training supplier Witness Systems, "Students can go on a mental vacation in the classroom, but in online learning, they have to be engaged." A lack of effective training leads to damagingly inconsistent service, he pointed out, referring to a recent US survey where several leading call centres were each rung six times. Only one gave consistent answers to the questions asked.

"Using online learning, you can send chunks of learning," Alban said. "By quizzing students, you can gauge whether they have retained the information. It's now very easy [to produce content], and now that the technology has caught up, people are recognising how critical it is to develop a strong, ongoing learning process."

In the US, the take-up of online learning is steadily increasing. In its annual market survey, industry journal *Training Magazine* found that 13% of the $US54 billion spent annually on corporate training goes on content that's delivered by computer with no instructor. Of that computer-based training, 31% was delivered through internal company networks, and 19% was pulled down from the Internet.

Online training providers are rushing to stake their claims in this rapidly growing market. Industry analyst IDC estimates that the US market is doubling annually and will grow from last year's $US2.2 billion to $US11.4 billion by 2003.

NETg estimates that by 2004, the Asia-Pacific market will be worth $US590 million. Over the past year, a number of companies have developed new elearning options for the Australian market. For example, last October, US elearning company Pathlore bought out Software Education Asia-Pacific and opened a Sydney office to sell its Learning Management System in the region. Executrain's Virtual University and Access1's AccessEducation services use satellite connections to deliver elearning content anywhere in Australia. In January, Global Knowledge Network Australia began working with Saba Software to support its ongoing elearning efforts in this country.

Australia still tardy

Elearning has taken off in the US, but despite the expanding range of options, Australian companies have been more cautious in shifting away from classroom learning and CD-ROM-based instruction. A recent survey of 500 Australian companies by online learning company NETg found that business is still far more reliant on CD-ROM training. Of the companies providing technology-based training, just 23% did so over their LAN and only 8% used the Internet. This is far below rates in the UK, where research found 29% used LAN delivery and 20% opted for the Net.

In Australia, universities are leading the elearning push. Their search for more flexible learning alternatives for students will eventually underpin the delivery of potentially profitable degrees that are undertaken completely online. Online courses using WebCT remote learning technology began trials at a number of universities last year. This year marks the first full-scale promotion of the courses at many sites.

Students seem to be welcoming the flexibility offered by these technologies. Students at the new University of Western Australia campus in remote Albany have been given access to streaming media files of lectures given on the main Perth campus. When Perth-based students found out about the service, they demanded access as well. The Australian Labor Party's promise to establish the 100,000-student University of Australia Online if it's elected later this year (see *APC* May, page 72) expands on this model.

It's easy to talk about the potential benefits of online learning, but effective elearning still requires well-designed content and a way to get it to students. Many elearning providers are resolving the first issue through partnerships with dedicated training and educational organisations. For example, HeadLight.com offers 3,000 courses from more than 40 content providers. However, problems with delivery are far more likely to limit Australia's potential to embrace elearning in a serious way.

Despite the formal launch of ADSL and cable modem services over the past 12 months, a number of factors restrict the delivery of rich elearning content: low penetration; a bias towards Sydney and Melbourne; and a lack of broadband options (other than satellite) for rural residents and those ADSL and cable don't reach. It's not hard to understand why the notion of learning that is accessible anywhere and at any time is still the stuff of fantasy.

Even on corporate LANs, where bandwidth isn't such a big issue, companies are slow to take up the call. According to Keith Dow, managing director of NETg, "It's been slower off the mark in Australia, and I suspect that's because conventional training methods are being adhered to, and the cost difference is not as large as it is elsewhere." NETg's XtremeLearning service claims a worldwide user base of 130,000 employees across 160 corporate clients.

Dow believes that Australian companies will eventually accept elearning as a means of resolving the continuing IT skills shortage. "All the major manufacturers are releasing new versions of their products this year, and that's going to create more demand for IT skills training," he said. "With the current reliance on the classroom, training isn't going to meet demand. People will have to look at new methods of training. Because it's far more common for people to access the Web, they can access training immediately."

Training: It's a PC thing

US businesses that teach computer applications to employees	99%
PC training delivered in a classroom	72%
Of all online training, percentage devoted to computer skills	55%

Source: *Training Magazine* industry survey, 2000

More than IT skills

Companies offering basic IT skills — training and context-sensitive help for Microsoft Word, Excel, Lotus Notes and other everyday tools of the corporate world — continue to dominate the elearning market in Australia. However, in the more mature US market, they've been pushed into the background as other subject matter comes online. *Training Magazine* found that 39% of US online training was devoted to IT skills, but 61% of training was in non-IT subjects.

Perhaps the flatness of Australia's online training market is the result of customers' perception that it's only good for teaching people how to use computers. These needs are already well served by internal instructors and third-party organisations, so companies comfortable with their existing arrangements may see little reason to change them. If the US experience is any indicator, the real value of elearning will only become clear when companies begin researching and producing content that develops valuable skills in management, business best practice, quality assurance and other non-IT areas.

Kerry Hogan, country manager of elearning infrastructure provider Saba Software, believes growing awareness of elearning's many benefits will quickly change this. "The real benefits are very much in the ongoing process, and the industries experiencing the most rapid change are the ones where there's a tremendous learning need," he said.

"Over the past five years, we've built a database of thousands of firms in the US, and have learned that in addition to producing competent and skilled workers faster, online training also has a powerful indirect effect of increasing employee retention. This increases customer satisfaction and retention, which is directly linked to profitability."

Increased adoption of elearning also provides other benefits. Employees spend less time away from the office, and companies can trim bloated travel budgets and save on sending trainees to unproductive onsite courses.

However, one very practical obstacle remains. Most third-party content is produced for the US, so Australian content developers face the burden of developing courses in management, business re-engineering, customer service and other areas for the local market. With the market still in its infancy, the profitability of this development effort is yet to be established.

So far, there's been no easy resolution to this chicken-and-egg problem. Stepping up the adoption of online learning in Australia appears to depend on a combination of elements: raising awareness of the solutions available; broadening the scope of the content offered online; and providing students with the means to access it. It may also be hastened by the imposition of new professional certification standards in some industries. No doubt there will be a strong demand for flexible learning solutions that allows professionals to combine learning with a full-time career.

Third-party elearning companies are playing on the popularity of the Web to increase their appeal to corporate customers. They are emphasising the fact that Web-based learning removes the need for costly infrastructure.

By lowering the bar for entry into online learning, they hope to encourage corporate experimentation that will lead to longer-term relationships. As more and more companies warm to the benefits, elearning may finally live up to the expectations it's been generating for almost a decade.

A Net for all



The Internet is supposed to be an international, boundary-breaking medium that all people can access and make use of. This is an assumption that is easy to accept if you speak English. For those who do not, it is a myth.

There are many sites that are not in English, and there are many sites that can be viewed in languages other than English. However, to access these sites you need to know enough English to navigate the predominantly English domain names. For those who use the same Roman script as English, there are still disadvantages. Now there are protests and calls for the true internationalisation of the Net. This month's Advanced 5 Minute Guide examines the problem, and looks at what can and is being done to solve it.

Our Basic Guide steers you through the confusing proliferation of Linux distributions. If you're thinking about getting into Linux, but don't know where to start, this is a helpful guide. Step by Step also comes to readers' rescue with the first in a two-part series dealing with the connectors on your PC. If you plan to tinker with the insides of your computer or connect up new hardware, this will alert to a few potential problems.

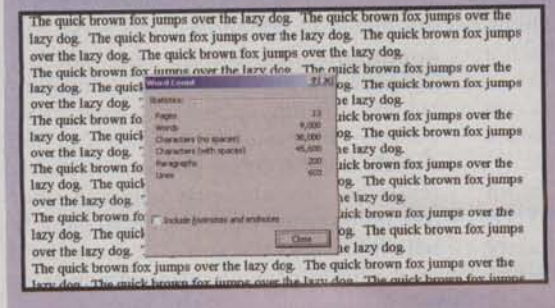
Our regular columns are all here to help. From understanding the Mac OS control strip, to learning how to manipulate that CRoll class, and sending email in Insite, Workshop should have something for everyone.

Workshop is a reader-input section. Please send your ideas, comments or criticisms to workshop@acptech.net, or to our snail mail address: APC Workshop, PO Box 4088, Sydney NSW 1028.

Bug of the month

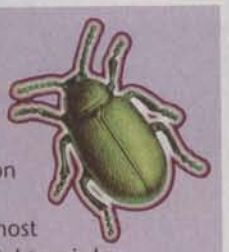
Hidden features (aka Easter eggs) don't normally make Bug of the month, but Cathy Stranoley came up with something so bizarre that we relented.

In a Word 2000 document, type =rand(200,5), then press Enter. Word will insert 200 paragraphs, each containing five copies of the sentence 'The quick brown fox jumps over the lazy dog.' You can change the numbers, with predictable results.



Now *that's* a feature we've all been waiting for!

Win! Win! Win!



Workshop is always on the lookout for the strangest, funniest, most interesting or downright weird software bugs. These include code snippets, features that function poorly, or things that crash a particular application. Anything and everything buggy deserves a mention.

Send us your favourite bug via email to bugs@acptech.net or snail mail to APC Bug of the month, PO Box 4088, Sydney NSW 1028, and you'll be in the running to win a software prize. Please send screen captures, example code listings or detailed instructions for triggering a bug in an application, as appropriate for your entry.

The winner's name, along with details of the bug, will appear in this column in *APC* July. So start hunting!

Michael Smith

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With so many Linux distributions, how do you figure out which one is right for you?

Picking the perfect penguin

Why are there so many different versions of Linux?

Linux is developed under an open source model, so the code that makes it run is freely available for modification. Numerous organisations have taken the Linux core and added various other features, such as graphical user interfaces, installation managers or enhanced server functionality. These packages are called distributions.

Others have ported Linux to run on hardware other than Intel PCs. Macs, Alphas, SPARC (scalable processor architecture) systems, Amigas and handhelds can all run Linux, but some of the distributions are not yet considered stable. Other distributions aim to minimise hardware requirements, or adapt Linux for use in highly specific fields. Some have been developed for commercial use, but others are products of the same experimental spirit that created Linux in the first place.

Are they all free?

In theory, yes. All Linux developers are required to make the source code for their products freely available, and you should always be able to obtain a copy of the code without charge. If you do this by visiting a Web or FTP site, the download only costs you your access fees. If you request it on CD, the developer may charge media and delivery fees, but isn't supposed to make a profit.

However, owning the source code is not much use if you don't know how to compile the code into working software.

Want to know more?

Caldera www.caldera.com
Corel www.corel.com
Debian www.debian.org
Mandrake www.linux-mandrake.com
Red Hat www.redhat.com
Slackware www.slackware.com
SuSE www.suse.com
Turbolinux www.turbolinux.com

A useful list of Linux distributions is maintained at www.linux.org. It includes distributions for people who speak languages other than English.

Most major Linux distributions also make their binary executables available for download from Web or FTP sites. These versions are entirely unsupported, and as the distributions get more elaborate (many are now more than 1G), downloads can be time consuming and expensive. Consequently, Linux is technically free, but many suppliers also sell their distributions on CD, along with other applications or support options.

Linux distributions also pop up regularly on the cover CDs of magazines such as *APC*, and books such as *The Linux Pocketbook* (see 'Linux made easy').

What are some of the best-known distributions?

Which Linux distribution you use often depends on personal preference rather than technical superiority. Even so, it is important to understand the differences between distributions, and these are highlighted in the list below. The list is not exhaustive, but it includes some of the best-known products. Their Web sites (see 'Want to know more?') contain more information and downloading details.



▲ Mandrake is easy to use and offers extra graphics management tools.

Red Hat is arguably the best-known commercial Linux distribution, and is certainly the most popular. Its notoriety comes partly from it being one of the first Linux companies to float on the stock exchange (August, 1999). It is highly regarded for its ease of installation, and its package manager system for software has become something of a default standard. Red Hat can be freely downloaded from the company's site, or purchased on CD in a range of configurations starting from about $50.

Debian is at the other end of the commercial spectrum. Maintained as a noncommercial system (donations to help defray costs are welcome), Debian is particularly popular within the core Linux developer community. Its extensive range of software packages also make it appealing to newer users. Three Australian suppliers offer CD copies of the Debian distribution — from $11 to $25 for a package of three CDs.

If ease of use is important to you (as it is for many Linux beginners), **Linux Mandrake** may appeal. Developed by the relatively new Linux competitor MandrakeSoft, Linux Mandrake adds graphical management tools to Red Hat or Debian. If you want to avoid the very large download, you can purchase CD-Rs locally for about $20, or a full version of the package for about $100.

Other well-known commercial distributions include those from **Caldera**, which are aimed at corporate users; **SuSE**, the dominant distribution in Europe; **Turbolinux**, dominant in the Asian market and offering a number of commercial packages integrated into its core OS; and **Corel**. Corel's Linux package is highly regarded for its ease of use, but the company recently announced plans to sell off its Linux division. This casts doubt on the future of the software. Among Linux's free products, one of the first Linux distributions, **Slackware**, is still available and popular. However, it isn't recommended if you have no prior Linux experience.

Angus Kidman

Linux made easy

If you want a detailed, step-by-step guide to getting started with Linux, look no further than *The Linux Pocketbook*. The latest version of this best-selling guide includes complete versions of Red Hat, as well as detailed instructions on partitioning, installing, updating, and making the most of your Linux system. It's available for $19.95 from your local newsagency or at www.magshop.com.au.

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How can the Internet be made accessible to non-English speakers?

Domain name dilemmas

What's wrong with the current domain name system?

One of the reasons that the current domain name system (DNS) is so efficient for such a wide range of applications is that it places major restrictions on the formats that can be used for domain names. The only characters allowed are the letters A to Z, the numbers 0 to 9, hyphens and full stops. Case is irrelevant; a capital letter is treated the same as a lower-case one for the purposes of domain names. This allows individual domain names to be mapped with a high degree of accuracy by eliminating most ambiguities.

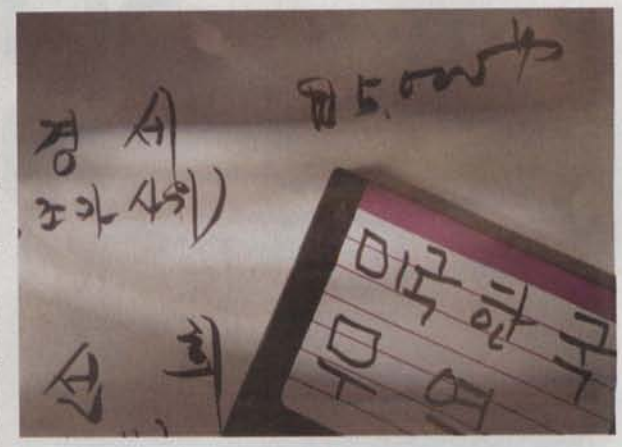
While this system works well for English speakers, it is not as useful for speakers of languages that don't use Roman (A to Z) script. For speakers of Chinese, Arabic, Russian or Hebrew, which use entirely different scripts, domain names are just as meaningless as the IP addresses they were designed to shield. Even if you speak a language that uses the Roman alphabet, the current system is not ideal. French speakers, for instance, can't include the accents commonly used when writing in French.

If the Internet is to be a truly international medium, domain names should be able to be represented in at least the major world languages. This is the aim of a number of the Net's governing bodies, most notably ICANN (the Internet Corporation for Assigned Names and Numbers) and the IETF (Internet Engineering Task Force). However, this highly desirable goal poses major problems from a technological standpoint.

Can't names be translated from one character set to another?

This was one of the first approaches examined, but it is rife with problems. First, there needs to be a system that can be used to represent characters from multiple languages. Unicode is a cooperatively designed standard that provides a unique numeric representation for more than 34,000 characters from 35 different scripts. However, it requires large amounts of data to represent Asian languages, and this reduces processing efficiency for DNS applications.

A second and far more intractable problem is that a large number of existing DNS applications, which use the restricted set of ASCII characters, would have to be adapted to deal with Unicode. This could threaten the Net's stability and interoperability in the short term, even if it delivers long-term benefits. This also applies to other similar coding systems.



A more widespread problem is the assumption of one-to-one correspondence between the characters in different alphabets, which almost never happens. Such an approach also imposes an Anglo-centric view on the Net, as it gives central prominence to the existing ASCII character set. The problem is even more pronounced for languages that use ideographic representation (where a single symbol represents an idea), as there is rarely a one-to-one correspondence between such symbols and their translations into other languages. The DNS assumes and requires that all domain names are unique, but this is made harder by multiple scripts and languages.

A less obvious problem is what to do with characters that exist in more than one script; the letter H, for instance, exists in both Roman and Cyrillic scripts. It is unlikely that internationalised domain names will consist solely of characters from one language; a name like amazon.com, for instance, might have the word 'amazon' left in Roman script while the domain is changed into the local script. As domain names are frequently typed in, it will not always be easy to deduce which character set the typist has in mind, especially in countries where multiple languages coexist.

What solutions have been proposed?

One of the more widely accepted possible solutions is Nameprep, proposed by the IETF, which aims to provide the kind of character set translation discussed above, complete with all its attendant difficulties. Current work on Nameprep has evolved as far as detailed rules for how to handle various character translation issues, but the system is still some way from completion and does not enjoy the universal support of other bodies.

A second approach has been widely advocated. This would remove the burden of translation from the DNS by adding an additional directory-like layer above the DNS where names could be represented in any character set. In this model, domain names take on a role analogous to that of IP addresses: used by software and hardware to resolve names, but rarely seen by end users.

Apart from requiring major additions to existing Net software, this approach forces users to change their Net surfing habits and most companies to abandon their existing domain names, which could be an intractable obstacle. One advantage is that it would leave the basic DNS system, which has demonstrated its stability over time, largely untouched.

Why are there ads online for international domain names?

Many companies have developed ad hoc ways to allow domain names to be represented in international character sets, but these frequently don't work for more than one language and often require the installation of special software. The success of the Internet has been built on open, extensible standards, so these solutions are unlikely to be ratified by its architects, even if they become widespread. As they often don't extend beyond the Web, these solutions make no allowances for Net applications such as email. They also usually lack an effective dispute resolution mechanism to solve questions like 'Does the ownership of the domain amazon.com give you the rights to the equivalent domain name in Cyrillic?'

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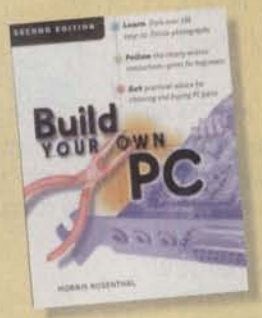
Build your own PC and get the lowdown on Dreamweaver and CorelDRAW.

Build Your Own PC

Constructing your own computer is complicated, and beginners and intermediate users usually shy away from the task. Fortunately, *Build Your Own PC* is an informative guide to the entire process.

It begins by examining each piece of hardware in detail and uses clear, concise language. At first, the book appears overly simple, but the depth of information it contains will be useful to all but advanced users.

Separate sections are devoted to building Intel and AMD systems in minitower, miditower and desktop cases. The Intel processors covered are the Pentium II, Pentium III and Celeron systems, and AMD is represented by the Athlon and Socket 7 K6



CPU's. A step-by-step section is provided for building each system. The extensive use of pictures and easily understandable text ensures that most readers will be able to successfully follow the directions.

The information is mostly up to date, but the current CPUs from Intel and AMD are not mentioned. The Pentium 4 and AMD Thunderbird/Duron use different motherboards and socket interfaces to their predecessors, and many people will find their omission disappointing.

Despite this, *Build Your Own PC* is an excellent book, with superb layout and easy-to-follow text.

Alan Crawford

Author Morris Rosenthal
Publisher Osborne
Contact McGraw-Hill
Phone (02) 9415 9899
Price $42.94
ISBN 0072124679
Rating ▮▮▮▮▮▮▮▮▯▯

The Complete Reference: Dreamweaver UltraDev 4

Dreamweaver UltraDev is Macromedia's Web scripting-enabled version of its hugely popular Dreamweaver HTML editor. This book covers all the major aspects of Dreamweaver in under 200 pages, and spends most of the remainder dealing with the scripting side of things.

ASP is the main language covered, but there are also excellent introductions to Active Server Pages, ColdFusion and Java Server Pages. ColdFusion and JSP are dealt with in enough depth to interest non-ASP programmers. PHP is only mentioned in passing, but this is unlikely to deter



Dreamweaver users or PHP programmers.

There are also compact guides to designing relational databases, constructing SQL statements, and integrating these into the UltraDev environment.

A third of the book is dedicated to advanced features such as building server extensions, working with objects, creating server behaviours, and using the UltraDev shopping cart, so it's not for scripting novices. This book will be useful if you have experimented with server scripting and database publishing, or if you are familiar with server scripting and are interested in trying out the Dreamweaver environment.

Daniel Potts

Author Ray West, Tom Muck and Tom Allen
Publisher Osborne/McGraw-Hill
Contact McGraw-Hill
Phone (02) 9415 9899
Price $84.95
ISBN 0072130172
Rating ▮▮▮▮▮▮▮▮▯▯

CorelDRAW 10: The Official Guide

CorelDRAW has long been regarded as one of the most complex and powerful graphics suites, and the latest release, CorelDRAW 10, is even more sophisticated than earlier versions. *CorelDRAW 10: The Official Guide* explores this software more comprehensively than any other book currently on the market.

The book begins with the basics of installation, an overview of the new features and a guide to the interface. The topics covered range from using basic object tools and filters, to dealing with 3D images and customising CorelDRAW through scripts in Visual Basic. An entire section is devoted to explaining how Visual Basic can be used to



implement complex macros — this is an indication of the book's depth and scope.

Each technique and effect has a detailed description and step-by-step guide, and numerous graphics and diagrams further clarify these procedures. A colour section displaying the outcome of each effect is also included.

The book is accessible to most readers and it manages to cover an impressive range of tips and techniques. The inclusion of a handy shortcuts pull-out and a CD-ROM brimming with extra tutorials, software and scripts makes this book a must-have for any serious CorelDRAW enthusiast.

Alan Crawford

Author Steve Bain
Publisher Osborne
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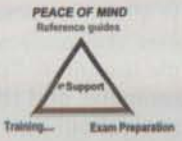
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Save yourself from a connector catastrophe with Step by Step's useful tips.

Stay connected

Connectors may not be glamorous, but if you upgrade your computer, you have to deal with a lot of them.

Many connectors are 'keyed' to only plug in one way, and some have a latch to stop them from being accidentally unplugged. However, even these can be more complex than you think.

Drive data connectors

All ribbon cable sockets are keyed (a notch on the top edge), but not all ribbon cable plugs are keyed. A plug with no key can be plugged into the socket either way, and some devices don't have a socket for the cable; they just have a multipin header.

Plugging a data cable in backwards just means the drive won't work until you plug it in properly. However, you can damage hardware if you plug a cable into a bare multipin header with one or more rows or columns of pins not plugged in.

The picture below is of a 40-wire and an 80-wire IDE cable. To plug current Ultra DMA/ 66 and Ultra DMA/100 drives into motherboards that support that standard and have them work at full speed, you need to use an 80-wire cable.

You can see the keying block on the side of the connectors; it appears to be a notched protusion on one of the longer sides. If you hold the connector facing away from you with the keying block on the top, you notice that the wire on your right has a red marking. This indicates conductor number one.

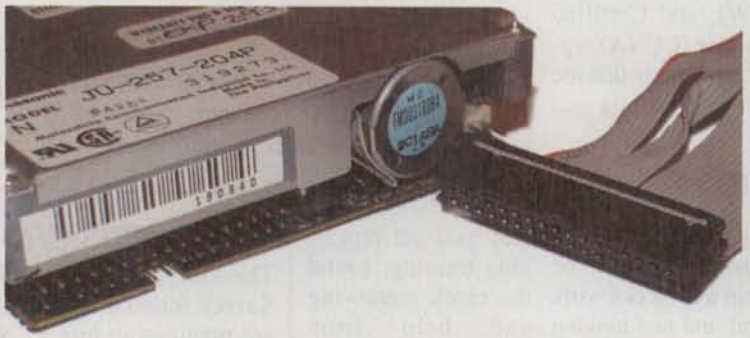


▲ A 40-wire (top) and an 80-wire IDE cable

Older 50-conductor SCSI ribbon cables look the same as 40-wire IDE cables, except they have 50 wires and correspondingly larger connectors.

On 80-wire IDE cables one pin on the connector is blocked off, which makes it impossible to plug them into anything older than an Ultra DMA/66 controller. The 40-wire cables work with everything, but if you use them, your drives and controllers only operate at Ultra DMA/33 speed.

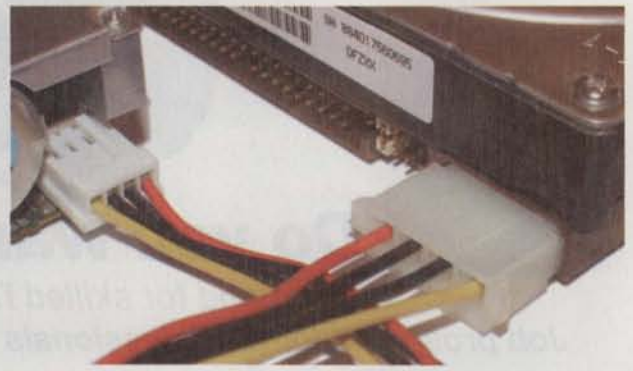
When using Ultra DMA/66 or faster drives, the master drive should be connected to the end of the cable. If you have a slave drive, connect it to the second drive plug, in the middle of the cable. For lower speeds, use any connector for any drive.



▲ A floppy drive cable and socket

Floppy drive data connectors tend to have the key at the bottom, as in the above picture. Floppy drives are built cheaply and often implement the keyed connector by cutting the keyway out of the circuit board on the bottom of the drive. This shows you where the key should go, but still allows you to connect the cable backwards. If you reverse the cable, your floppy drive won't work, but it will probably still have the activity light on.

If you can't figure out which end of a bare pin header is which, there's often a number or two printed at one or both ends of the circuit board under the header. The end of the header with 1 printed next to it is the end you plug the side of the cable with the stripe into.



▲ Small and large four-pin drive power connectors

Drive power connectors

There are two types of drive power connectors, and both have four pins. The larger ones, sometimes referred to as Molex connectors, are for hard drives and CD-ROM drives. The smaller ones are for floppy drives. Both types are keyed.

It's possible, but difficult, to plug in the small floppy power connector backwards. It's not possible to plug a larger connector in the wrong way.

The larger connectors often cause trouble by seizing and they can be very hard to unplug. When you're trying to wrestle the power cable out of a drive, bear in mind that all that's usually holding the power socket on to the drive are four solder blobs, and it is possible to wrench the socket right off the circuit board.

If this happens, it's not usually a complete disaster — anybody who can use a soldering iron can usually put the connector back, or at least rig some wires to allow you to run the drive again. However, if a connector has seized, don't wiggle it around. Take the drive out of the computer and try to pull the connector straight out backwards with pliers. That puts the least strain on the soldering.

Next month, Step by Step looks at motherboard connectors.

Daniel Rutter

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Daniel Rutter can be contacted at dan@dansdata.com.

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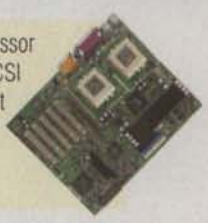
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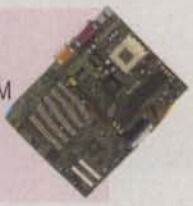
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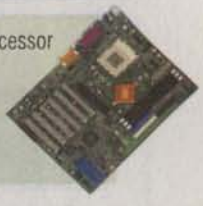
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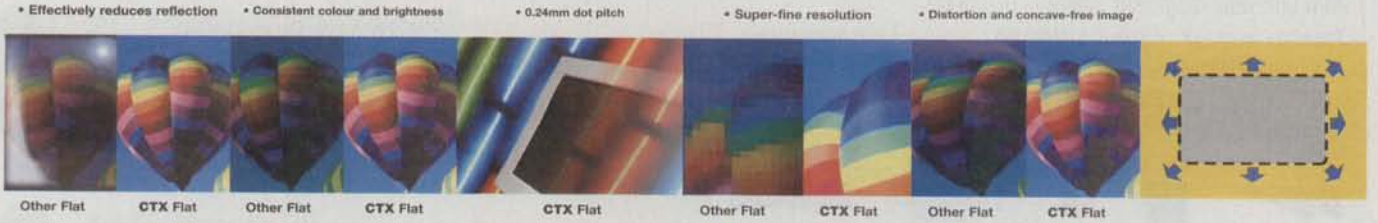
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Remote control

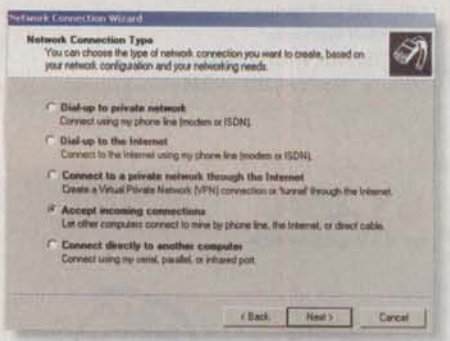
Virtual private networking (VPN) can be very complicated, and it would probably take an entire book to explain it fully. This month's column provides a basic explanation of VPNs, the technology involved, and what has to be done to set one up in Windows 2000. We also look at how easy it is to connect to your office VPN, if it has one. The Windows 98 page shows you how to add an autorun feature when making your own CDs.

VPN basics

A VPN is a private data network that makes use of the public telecommunication infrastructure and the worldwide Internet. Normally, unencrypted data travelling on the Internet can be intercepted, which is undesirable if you are dealing with confidential data originating from a company network. A VPN allows you to send data over a public network and still keep it private, using a tunnelling protocol and other security procedures. This means that remote users can connect to and use the company network as if they were physically at work.

In the past, remote users who wanted to connect to the company network did so with a direct connection. The procedure to establish this was sometimes complicated and required additional resources. The company had to set up as many telephone lines and modems as required, and it also had to worry about additional costs incurred by long-distance phone calls. Direct dialup connections are still popular and continue to be used by many companies, either as the most common connection for remote users or as a backup in case their VPN fails.

VPNs provide numerous advantages, including reduced costs and easier access.



▲ Windows 2000 Professional allows you to set up a single VPN connection.

With a VPN, network administrators don't have to worry about the installation or upkeep of additional telephone lines and modem banks. If an employee travels interstate or overseas and requires access to the company network on a laptop, they only need to worry about connecting to the Internet. Once the connection is established, connecting to the VPN is relatively straightforward.

A VPN can be used in many situations. Multiple company branches can be connected in a wide area intranet. Low-cost, secure extranets can be established between business partners. Employees can work from home and have the same access to network resources as if they were in the office. Mobile employees who are rarely in the office can access and update data quickly and easily, whether they are locally, nationally or internationally based.

The encryption of data before it is sent over the Internet is the most important facet of VPN security. The encrypted data is then decrypted at the receiving end. In Windows NT, the only protocol you could use for VPN was the Point-to-Point Tunneling Protocol (PPTP). Windows 2000 provides extended support for Layer 2 Tunneling Protocol (L2TP), which has more powerful security features.

PPTP encrypts data packets, puts a Point-to-Point Protocol (PPP) wrapper around them, and sends the packets to the destination server over the Internet. The server receives the packets, unwraps and decrypts them, then puts them on its own network. PPTP data can be encrypted using Microsoft Point-to-Point Encryption (MPPE), but only if the initial connection is negotiated using MS-CHAP (Microsoft Challenge Handshake Auth-entication Protocol) or EAP/TLS (Extensible Authentication Protocol/Transport Layer Security).

L2TP performs roughly the same functions as PPTP. However, L2TP implements the latest IP security technology, named IPSec. IPSec negotiates between your computer and its remote tunnel server before establishing an L2TP connection, which secures passwords and data. The L2TP VPN also requires the use of certificates, meaning that these networks are much more difficult to set up. VPN connections created through Windows 2000 are configured by default as an automatic server type. This means that L2TP with IPSec encryption is tried before PPTP.



Setting up a VPN

In Windows 2000 Server, the number of connections is limited only by the computer and the hardware configuration. Under Windows 2000 Professional, it is possible to set up an incoming network connection that supports a single VPN connection. You can set up a VPN in Windows 2000 Professional by working through the steps that follow.

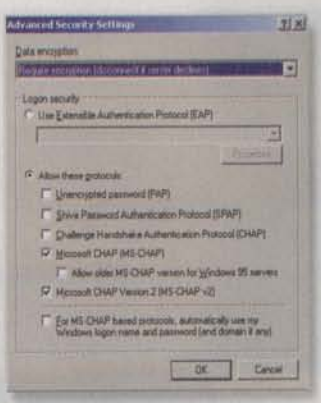
First, log in with administrator privileges and select Start, Settings, Network and Dial-Up Connections, then Make New Connection. In the Network Connection Type window, select Accept Incoming Connections and click Next. You don't want to allow anyone to dial into the network using a modem (the old remote access method), so click Next again. Now, select Allow Virtual Private Connections and click Next.

The next step involves selecting the people who will be using the virtual private connection. Only select those who require access to the VPN. Next, select the networking components (such as protocols and file sharing) that you want to enable. The two main components you need are the TCP/IP protocol and any file-sharing components associated with your network. After completing the wizard, you find the Incoming Connections icon in the Network and Dial-Up Connections menu. To change any of the

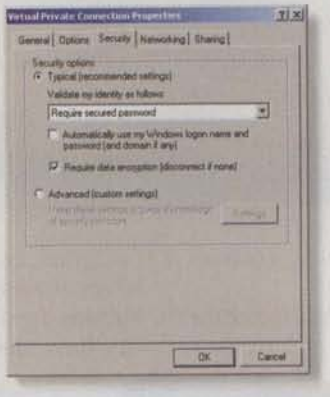
Incoming Connections settings, right-click the icon and select Properties.

Windows 2000 Server requires you to configure the Routing and Remote Access Service (RRAS) that is one of the optional Windows 2000 components. To configure RRAS, log in with administrator privileges, go to Start, Programs and Administrative Tools, and select Routing and Remote Access. Add your server if necessary, then right-click it. Now, choose Configure and Enable Routing and Remote Access, which starts a setup wizard. Select Virtual Private Network server, then pick a remote protocol in the next window (TCP/IP is a good choice), and click Next. Specify the server's Internet connection and click Next. Choose a method to assign IP addresses to the clients, either automatically or from a specified range of addresses, and click Next. The final window provides you with the option to use a RADIUS server, which is a Remote Authentication Dial-In User Service that authenticates and authorises dialup and VPN connections.

The final step is to give remote access permission. Open Active Directory Users and Computers from the Administrative Tools folder. Click on the Users folder under your domain name and select the person for whom you want to enable remote access permission. Open the Properties window for them and click on the Dial-in tab. Then specify the option to allow the person remote access permission.



▲ These are further levels of security to ensure that data inside the VPN remains private.



▲ VPNs have several levels of security to ensure that your data remains private.

For a Windows 2000 Server operating as the gateway for numerous VPN connections, a couple of other things need to be taken into account. If possible, the machine should have a lot of RAM and be dedicated to its remote access task. It needs a connection to the internal network as well as a dedicated connection to the Internet with a static IP address. A dynamic IP address is not an option, because remote users need to know the IP address to be able to connect.

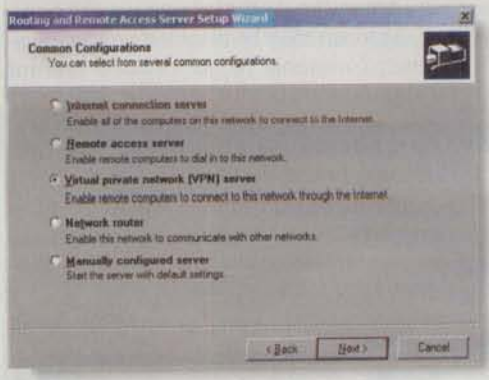
Connecting to a VPN

Connecting to a VPN is very easy. The most important piece of information you need is the VPN host name or IP address, which you need to obtain from your network administrator. First, open Network and Dial-Up Connections and select Make New Connection. After the welcome screen, select Connect to a private network through the Internet, and click Next. If you're using a dialup Internet connection, the system asks you whether you want the computer to autodial your ISP. In Windows NT, you have to dial in to your ISP manually before activating the VPN connection.

Now, enter the VPN host name or IP address and then choose whether the connection applies to you or to all system users. Once you have created this connection, you can connect by selecting the new icon in Network and Dial-Up Connections.

You may want to connect to your company's VPN from a computer that doesn't use Windows 2000. Connecting to a VPN in Windows 98 or Windows Me is quite different to doing so from Windows 2000. You need to install the VPN component from the Add/Remove Programs utility found in the Control Panel. After restarting your computer, create your VPN connection from the Dial-Up Networking folder. When selecting a device to make the connection, select the Microsoft VPN Adaptor from the drop-down menu.

Kieran McNamee



▲ In Windows 2000 Server, VPNs are created through the Routing and Remote Access Service.

Windows shareware

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These programs and others can be found on this month's cover CD, along with more detailed reviews.

Keiran McNamee can be contacted at kmcnamee@acptech.net.

Windows 98

Autopilot for your CD-ROMs

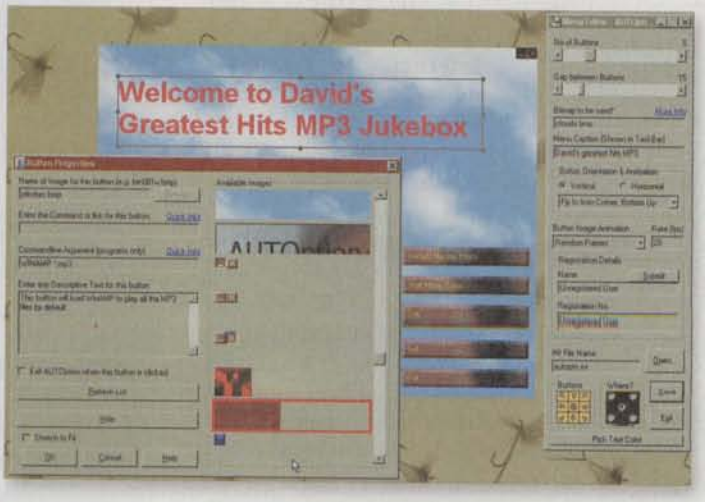


A minor but useful feature of Windows 95 and its successors is the ability to run CD-ROMs automatically after they are inserted into the computer's drive. This feature is activated by a file in the root directory of the CD-ROM called AUTORUN.INF. Windows checks for the file and executes it when the disc is inserted. AUTORUN.INF is just a basic text file consisting of a few lines of commands drawn from a very limited vocabulary. See msdn.microsoft.com/library/psdk/shellcc/shell/Shell_basics/Autoplay_cmds.htm for a rundown of the six available commands.

Most commercial software uses the autorun feature to boot up an executable program to run the software and to install it if necessary. You can add the same automatic features when making your own CD-ROMs. For example, you could include an MP3 player on a disc of songs, then create an AUTORUN.INF that automatically loads the player and starts playing the music on the disc, using the following commands.

```
[autorun]
open=winamp.exe *.mp3
icon=winamp.exe,0
label=Cool MP3s
```

In this case, 'open' instructs Windows to run winamp.exe; 'icon' specifies which icon Windows should show on the desktop when the CD-ROM is loaded; and 'label' specifies what shows up when the disc is opened using Windows Explorer.



▲ Creating an autoloading interface for a music CD

Jazz up the startup sequence

For a more professional touch, consider shareware tools such as Pollen Software's AUTOption and AUTOption Graphic. These are Australian-developed programs that allow you to jazz up the startup sequence on your CD-ROMs.

AUTOption Graphic can be used to build a startup interface that loads automatically when the CD is inserted in the drive. Any BMP file can be used as a background image and an onscreen button. The onscreen window automatically fits the size of the background image and can be positioned in nine locations on the screen.

It takes about two minutes to create the sample interface shown below. First, double-click on the heading text to get a dialog box where you can enter text and assign colour, size and appearance. After selecting OK, drag the handles around the text box to stretch the text across the window (you can align it vertically just as easily).

Customise buttons

The next task is customising the buttons. The button bar can be positioned vertically or horizontally, but that's about the only room room for creativity. The program maintains consistent spacing between each button and doesn't allow individual buttons to be moved by themselves. However, you can choose how the buttons are displayed; for example, you can have them fly into place from the corner of the window.

You can also have the button change appearance as the mouse is moved over it, and again when the button is selected. By double-clicking on each button, it is possible to assign actions (such as running a certain program file) when the button is clicked.

Once the interface is set up, it must be transferred to the CD-ROM by copying the program files and bitmaps into a directory on the CD. The subdirectory is called AUTOptn by *default, but can* be changed if you also change the reference in the AUTORUN.INF file that's included in the program and written to your root directory. Burn your CD-ROM and the menu will show automatically when the disc is inserted.

Autorun may be disabled on some systems. To enable it, go to Start, Control Panel, System, Device Manager, and select your CD-ROM drive. Choose Properties, then Settings, and make sure the Auto insert notification checkbox is ticked.

For more information on AUTOption and AUTOption Graphic or for downloads, go to www.pollensoftware com. Each program costs $US55 to register.

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Increase your skills with the Revision Control System.

Spot the difference

Last month, this column covered the basics of using the Revision Control System (RCS) to manage different versions of text files with the ci, co, rcs and rlog commands. This month, you learn how to compare differences between files when using RCS, about its revision numbers, and some concrete examples of how to use RCS to help with system administration tasks.

Viewing differences between revisions

The March Linux column (see page 126) looked at how to use the diff command to compare the differences between two files. When working with different versions of the same file, as in RCS, you would usually use diff to see what has changed. It would be tedious to go through the checkout procedure to compare the files, so RCS has a command called rcsdiff, which retrieves the appropriate versions and runs diff on them.

For example, to see what has changed between revisions 1.2 and 1.4 of a file called testfile, run the following command.

```
rcsdiff -r1.2 -r1.4 testfile
```

A sample run of rcsdiff is shown in figure 1. You can see that, with the exception of the header lines, the output is identical to that provided by diff.

If you already have testfile checked out, rcsdiff doesn't overwrite your working file; it just ignores it. However, sometimes it's useful to compare a particular revision of a file with a working version you have checked out. To do this, use one -r switch instead of two.

You may also need to compare the latest checked-in version with your checked-out version. This allows you to see what changes you have made since you checked the file out. It's handy if you are trying to write a check-in comment and have forgotten what you've changed. To do this, don't specify any revisions as follows.

```
rcsdiff testfile.
```

As rcsdiff uses diff, the output formats described in the March column (see page 126) — -c for context, -u for unified, and so on — are also available. For example, to obtain a unified diff between revisions 1.2 and 1.4 with five lines of context, use the following command.

```
rcsdiff -r1.2 -r1.4 -u5 testfile
```

Managing revision numbers

If you've checked a file in and out a few times, the revisions are numbered 1.1, 1.2 and so on. These are not decimal numbers. They are two numbers with a full stop between, so 1.9 is followed by 1.10, not 2.0.

RCS revision numbers have no significance outside the RCS. For example, with a document you periodically publish on the Internet, you can call it version 3.1, even if RCS calls it revision 1.47. It's possible to tell RCS explicitly which revision number to use when checking in a file, but you rarely need to.

However, it would be annoying if every time you wanted to refer to your version 3.1, you had to remember that RCS called it 1.47. To get around this problem, RCS is able to use a symbolic name as an additional way to reference that revision of the file. For example, to give revision 1.47 of testfile the symbolic name of version_3_1 (full stops cannot be used in symbolic names to prevent confusion with revision numbers), use the following command.

```
rcs -nversion_3_1:1.47 testfile
```

If you want to give the latest revision of testfile a symbolic name, you can leave off the revision number, as below.

```
rcs -nversion_3_1: testfile
```

To save time, you can also specify a symbolic name when checking in a file.

```
ci -nversion_3_1 testfile
```

```
g@kylie.netcraft.com.au: /home/g/testrcs
[g@kylie testrcs]$ rcsdiff -r1.2 -r1.4 testfile
===================================================================
RCS file: testfile,v
retrieving revision 1.2
retrieving revision 1.4
diff -r1.2 -r1.4
3d2
< Kissing with golden face the meadows green,
12c11
< The Region Cloud hath mask'd him from me now.
---
> The region cloud hath mask'd him from me now.
14a14,15
>
> — Sonnet XXXII, Shakespeare
[g@kylie testrcs]$
```

▲ Figure 1: A sample run of rcsdiff



Once you've assigned a symbolic name to a revision, you can use that name whenever you need to refer to that revision. So to check version 3.1 out you use the following command.

```
co -rversion_3_1 testfile
```

To compare the differences between version 3.0 and version 3.1, type the following.

```
rcsdiff -rversion_3_0 -rversion_3_1 testfile
```

Using RCS for system administration

You can use RCS to manage the system configuration files in the /etc directory. If you've been working with your Linux system for a long time, you've probably made a change to a configuration file, and then wished you'd made a backup. Here's a general procedure to follow which will help with these sorts of mishaps. No new commands or options are introduced here; it's just a demonstration of how to use the ones that have already been covered.

The first step, which you only need to do once, is to create the repository directory for the /etc directory, with mkdir /etc/RCS. If you want to manage the files in the subdirectories of /etc, such as /etc/sysconfig or /etc/httpd/conf, you need to create RCS directories within those subdirectories. However, this can wait until you need to modify any of the files within those directories.

When you want to modify a file, check if it is already under revision control by looking in the RCS directory for the corresponding ,v file. For example, if you want to modify /etc/hosts, you could run ls -l

/etc/RCS/hosts,v. If the file doesn't exist, you need to check it in by running ci -u hosts. It's important to use the -u switch here or RCS will also remove the file from the directory, which is not good.

Next, check it out with a lock to tell RCS that you want to modify it; use co -l hosts. You can then make whatever changes you like, knowing that you can easily revert if you make a mistake.

After modifying the file and testing your changes, check the file back in. If the file is large, you can run a command such as rcsdiff -u hosts to see the changes you made, and then ci -u hosts to check it back in.

By following the steps above, you will find that system management gradually becomes a whole lot easier. It's more work to start with, but using revision control is a good habit to get into.

A few tricks

Here are a few tricks to simplify these steps.

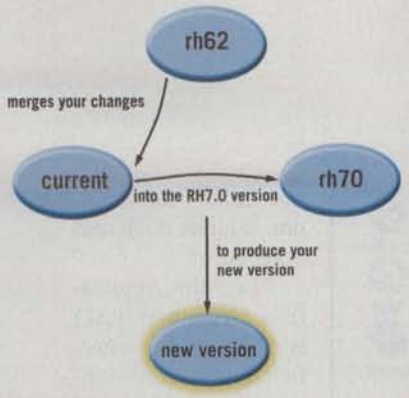
- If /etc/hosts isn't already under revision control, rather than running ci -u hosts and co -l hosts, you can perform both commands in one step with ci -l hosts.
- Instead of using ls -l /etc/RCS/hosts,v to see if a file is in the RCS, you can try to check it out with co -l hosts — if the file doesn't exist, RCS tells you, and if it does exist, you can go ahead and edit it.
- You can also run co -l hosts if you forgot to check the file in. RCS notices what you've done and asks whether you really want to discard the current copy. Answer 'no' and you can check it in.

Managing upgrades

The symbolic name features of RCS can be put to good use when upgrading from one version of a Linux distribution to another. Our examples will be applicable to any RPM-based distribution; similar principles apply to Debian-based distributions, but the way that configuration files are handled during upgrades is different.

When you upgrade from one version of an RPM package to another, RPM attempts to handle configuration files intelligently. For each configuration file, the following rules generally apply, but the package creator can override them.

- If the configuration file didn't change between the release you are upgrading from and the one you're upgrading to, but you modified the original file, then your changes will be left alone.



▲ Figure 2: Merging rh62 and current into rh70

- If the configuration file did change between releases, and you didn't modify it, then the new version of the configuration file will be installed.
- If the configuration file changed between releases and you modified it as well, it's a little trickier. As it's not possible to guarantee that the changes you made are compatible with the new package version, your changed file is renamed so that it has a .rpmsave extension, and the new version of the configuration file is put in its place.

When a .rpmsave file is created, you are expected to merge your changes into the new file. For small files, this can be a simple operation, but for large files, tools such as RCS make things far easier.

Imagine that you installed Red Hat Linux 6.2 some time ago, and after you placed your configuration files into RCS you added a symbolic name of rh62 to the original versions of those files. Now, you've upgraded to Red Hat Linux 7.0, but when you did, you saw in the upgrade log that /etc/squid/squid.conf was moved aside to squid.conf.rpmsave, and a new squid.conf was created. First, check in the new configuration file and add a symbolic name of rh70. Imagine also that you've added the symbolic name of 'current' to the version you had checked in before the upgrade. There are now three versions: rh62, rh70 and current. You have two options for constructing a new configuration file.

- Look at the changes between rh62 and rh70, and merge those into current
- Look at the changes between rh62 and current, and merge those into rh70 (figure 2 shows this diagramatically).

To find out which is easier, run the following commands and see which shows the fewer number of changes.

rcsdiff -rrh62 -rrh70 -u /etc/squid/squid.conf

rcsdiff -rrh62 -rcurrent -u /etc/squid/squid.conf

You can then manually apply the changes to the other version, or try to use patch (see *APC* April, page 132) to make the changes automatically. As all the versions are stored in the repository, it is difficult to cause any damage that you can't fix, because you can just check out an older revision of your file.

Geoffrey Bennett

Geoffrey Bennett can be contacted at geoffrey@netcraft.com.au.

Linux shareware

Astaro Security Linux

This small Linux 2.4 distribution is designed especially for firewalls.

CommuniGate Pro 3.3

This mail server has a number of additional features including virus scanning and Web mail.

McAfee VirusScan for Linux

Look for Windows, Mac OS and Linux viruses on a Linux server with this virus scanner.

PySol 4.6

You'll find games such as Solitaire, Klondike, Spider, Golf on this program.

Quake III Arena 1.27G Beta Patch

Linux Quake III gamers can play the Team Arena add-on with this patch.



These programs and more can be found on this month's cover CD, along with more detailed reviews.

For a complete archive of *APC* Linux columns, see apcmag.com.

Sitting pretty

Make your PDA easier to use with these handy utilities.

Windows, Linux and Mac users have been able to customise their computer desktops since the introduction of each operating system. Simple things such as screen backgrounds, screensavers, pointer themes, and the general look and feel can be adjusted to suit your personal style. This month's column shows you how to change the look and feel of your Palm or Pocket PC and make it easier to use.

Palm

The Palm interface is designed to be simple and easy to use. There aren't many changes to make within the operating system, apart from adjusting the built-in applications. For example, you can make the font bigger so that your text is easier to read, or smaller so you can fit more information on the screen without scrolling. Open the Datebook, Address, Tasks, or Memo Pad application and tap on the menu button, then on the Options menu to find the font options. To set the default application view, tap on the Application button, then the Menu button, followed by Options and Preferences. You can view by icon or by an abbreviated list that allows you to display more items on the screen at once.

To personalise and tweak your Palm further, you need some extra shareware or freeware applications. There are dozens of programs that can be used to replace the standard Palm applications. They tap into the built-in Palm databases that hold your calendar, address book and other data.



▲ PAL is a simple but effective application manager.



▲ SilverScreen is another application manager.



▲ GoBar adds the familiar Windows Start menu to your Palm.



▲ Make better use of the Pocket PC Today screen with Dashboard.

The Palm Application Launcher (PAL) is a simple but effective application manager available from www.dovesoftware.com. At first glance, it looks very like the standard Palm application launcher, except for some additional information and icons at the bottom of the screen. PAL allows you to drag your program icons on to one of three icons. You can then quickly categorise, beam and delete programs. PAL also provides a pop-up list of favourite applications, an option for changing to list or icon view, and contrast settings.



Another popular application manager is SilverScreen. This has a very fancy interface and options for customising the look and feel of the buttons and screen by using add-on themes. Silver to drag and drop your applications into a pop-up toolbox to get in-formation on the program, or to categorise, beam or delete programs. Deleted programs are placed in an archive and can be recovered later or permanently removed.



▲ Megalauncher II gives you complete control of your Palm applications.

GoBar brings the familiar Windows Start menu to your Palm. Unlike Windows, the menu is only accessible in the applications menu and not all of the time. GoBar has similar functions to SilverScreen and PAL, such as beaming and quick delete, but it doesn't allow you to undelete as SilverScreen does. GoBar can also beam itself to someone else. Unfortunately, it seems to respond more slowly than the other applications when doing screen refreshes and tasks.

Megalauncher II looks very different to the standard application launcher, and it has the most flexible and widest range of features of any of the launchers discussed here. In addition to the standard drag-and-drop features, Megalauncher II has a quick-pick list and a world clock. You can view applications by icon or list and also see the associated databases that go with each application. When deleting an application, you can choose to remove all data and preferences for an application. Megalauncher II can also check hardware diagnostics, and includes a backup utility for storing data in the unused flash memory in your Palm.

Pocket PC

Pocket PC owners can also customise their PDA's settings. One feature that is frequently customised on Pocket PCs is the Today screen. It shows an overview of who owns the device, the number of outstanding appointments, and tasks. You can customise it by tapping on the Start menu, selecting the Settings item, and tapping on the Today icon on the bottom left part of your screen. From here, you can choose to display a variety of features, such as the date, owner information, calendar items and tasks.



▲ GigaBar is a Windows-style taskbar for the Pocket PC.

The Today screen is potentially very useful for providing an overall view of your personal agenda. However, the built-in features are rather limited. There are many programs available to personalise the look and feel of the Today screen, and to extend its functions to include a wider range of views and options. Programs like Dashboard (www.snoopsoft.com/pocketpc/dashboard.html) provide collapsible detailed day views, allow you to read emails on the Today screen, view task details, launch programs from the Today screen, modify the Today screen font sizes, and install skins to change the look of the screen. There are a wide variety of skins available online at the Dashboard site (www.snoopsoft.com/pocketpc/skins.html) and you can also create your own Dashboard and GigaBar skins with a program called Skin Me (www.desertware.com/skinme/screenshots.htm).



▲ StarTap is another application manager with the familiar Windows desktop style.

Accessing Pocket PC applications can be cumbersome. Some hardware manufacturers such as Casio, Hewlett-Packard, and Compaq put application launchers in with their products, but these tend to have limited features. You may want to look at some of the freeware and shareware options that are available. Dashboard allows you to launch programs from the Today screen, and programs like GigaBar and BananaPC put easy-to-access toolbars at your disposal.

GigaBar uses the familiar Windows-style taskbar and can be adjusted using customised skins. When you run an application such as the Calendar, a small icon appears on the GigaBar, just like on your Windows PC. GigaBar allows you to see which applications are running and switch between them quickly by tapping on the appropriate icon. It also allows you to close applications to free up valuable resources, take screenshots, get quick access to programs or folders on your Pocket PC, adjust your sound settings and view your battery levels instantly.

For something basic that takes up less space on your screen, try the BananaPC freeware (www.snoopsoft.com/pocketpc/bananapc.html). This includes features such as single-tap mute, customisable icon sizes and locations, and the ability to shut down any application with a single tap of the stylus.

StarTap is another extremely popular application manager for the familiar Windows desktop environment and is available from www.thumbsupsoft.com. You can quickly create shortcuts to files and applications on your desktop and arrange them by dragging them into place. StarTap also has a Windows-style taskbar for switching between applications, a recycle bin and a control panel. You can customise your desktop by changing colours, fonts, icons, sounds and wallpaper. The built-in file manager has features similar to those of much more expensive alternatives.



▲ Cramped for screen space? Try BananaPC.

With these tools, you should be able to easily personalise and customise your PDA. Over the coming months, this column will also show you how to customise each of the built-in applications on both Palm and Pocket PC devices.

Ronald Rosenbaum

Note: Most of the applications mentioned in this column are available on this month's cover CD.

Ronald Rosenbaum can be contacted at ron@ats.au.com.

PDA shareware

abcDB

This database can handle large tables and is fast and easy to use.

Shadow Plan

Stay organised with this task manager, outliner and hierarchical checklist.

Beatnik

Play linear audio files including MP3, WAV, MIDI and RMF files with this utility.



eWallet

Use this program to organise bank accounts, credit cards, memberships, Web sites and other personal information.



GigaBar

Switch between tasks, close down programs, and manage your Pocket PC with this Windows 98-style taskbar.

All these packages and more can be found on this month's cover CD, along with more detailed reviews.

For a complete archive of *APC* PDAs columns, see apcmag.com.

Take control

Take control your Mac quickly and easily using the handy Control Strip.

The Control Strip was originally a feature specific to the PowerBook, but it soon became a standard part of the system software for all Macs. It provides you with quick and convenient access to a variety of settings without having to open the corresponding control panel. This can include controls for turning AppleTalk on or off, playing your favourite music CD or changing the resolution of the monitor. This month, the Control Strip is explored in more detail.



Quick tips

If the Control Strip isn't visible on your screen, you need to open the Control Strip control panel and make sure that the radio buttons are set to Show Control Strip. Once the Control Strip is open, you can reposition it by holding the Option key down and dragging the handle end of the strip with the mouse. On larger displays, it is convenient to have the Control Strip just above the bottom of the screen. That way, any tabbed folders are still visible. You can tuck it in at the foot of the screen when using a 640 by 480 pixel display. When the strip is minimised to the handle (click once on the handle), it's possible to dock the strip against either side of the screen.

If your Control Strip contains more buttons than there is room for, the arrows at either or both ends will be shaded dark grey to show that they are active. Click a dark grey arrow to scroll the strip in the corresponding direction. You can change the order of items on the Control Strip by holding down the Option key and dragging them to a new position.



▲ Even a display 1,024 pixels wide doesn't have enough room for this Control Strip — the shaded arrow at one end means 'scroll for more'.

Managing CSMs

The Control Strip is a holder for the Control Strip Modules (CSMs), which do the real work. These are stored in the Control Strip Modules folder within the System Folder, but a CSM Finder icon does not always match the icon in the Control Strip. Mac OS comes with a good selection of CSMs, but you can only install those relevant to your hardware. CSMs may be written in such a way that even if they are installed, they don't appear in the Control Strip if they aren't supported by the Mac's configuration.

CSMs are only active when they are in the Control Strip Modules folder. If you create a folder called Control Strip Modules (Disabled), you can move CSMs between the two to control whether or not they appear in the Control Strip. This can be done manually, or you can use Conflict Catcher to control CSMs, as well as control panels, extensions and so on.

Open Conflict Catcher, choose Preferences from the Edit menu, then click the Folders icon from the list in the left-hand pane. Select the Control Strip Modules item in the right-hand pane and click OK. Back in the main window, the Control Strip Modules section appears towards the bottom of the list. Click on individual CSMs to activate or deactivate them.

Where a CSM is dependent on a control panel or other startup item, you can link them so that Conflict Catcher turns them on and off together. To do this, choose Edit Links from the Special menu, click Create, give your new link a name, and add the items that are to be turned on and off together. It's easier if you select Listed by Name, as the names of related items tend to start with the same word. When they're all in the Files in Link pane, click OK and then Done.

Apple CSMs

To use a CSM, hold down its button on the Control Strip and make a selection from the pop-up menu. There are a number of common Apple CSMs.

The **AppleTalk Switch** (identified by a picture of a classic Mac with symbolic network cables) is used to turn AppleTalk on and off.

CDStrip (CD icon) applies to all Macs with factory CD-ROM or DVD drives, and provides the controls needed to play audio CDs without opening a player application. It's particularly handy for skipping tracks.

Energy Settings (moon and stars icon) bypasses the Energy Saver control panel to choose between the Better Conservation and Better Performance settings, spin down the hard disk, or put the computer to sleep. There have reportedly been some problems with this feature.

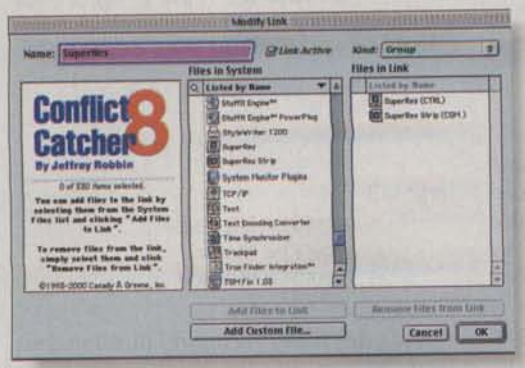
The **Keychain Strip** (padlock icon) provides a shortcut for unlocking a keychain, the Mac OS 9 feature that stores passwords and digital certificates under the control of one master password.

The **Location Manager Controls** (a pair of preference icons with red arrows indicating their exchange) allow you to select any of your Location Manager settings (see *APC* August 2000, page 137 for details).

Monitor BitDepth (a screen icon showing colour bars) and **Monitor Resolution** (a screen icon with a chequerboard) allow you to choose the number of colours or shades of grey, and the screen resolution.

The **Printer Selector** (a stylised and rather dated printer icon) pops up a menu of the available desktop printers.

The **QuickTime Strip** (QuickTime logo) is different from the previous CSMs. Instead of controlling anything, it is a shortcut for opening the QuickTime Player, PictureViewer and QuickTime set-



▲ Creating a link in Conflict Catcher helps to ensure that any interdependent items are activated together.

tings, and depending on the software versions installed, a selection of QuickTime streaming channels.

The **Remote Access Control Strip** (classic Mac icon plus telephone pole) allows you to select a Remote Access configuration and make or close a connection. It is much more convenient than making regular trips to the Remote Access control panel.

Sound Volume (speaker icon) delivers a pop-up volume slider — a handy companion for CDStrip.

The **SoundSource Strip** (old-fashioned microphone in front of a CD icon) shows a menu of the available built-in or add-on sound input devices.

Speakable Items (a human ear icon) gives a shortcut to the Speech control panel, as well as a toggle to activate Speakable Items so you can give spoken commands to your Mac.

Web Sharing CS (a purple folder icon with a strange 'badge' that's supposed to represent a Web page being held by two hands) allows you to turn Web Sharing on and off, or open the Web Sharing control panel.

Other modules only apply to particular computer models, such as the PowerBook range.

The **Battery Monitor** (battery icons with bars showing the charge in the left and right batteries) indicates how much power you have left. When running on a battery, this CSM also displays a 'speedometer' to show how quickly the power is being used, along with a (sometimes optimistic) estimate of the time remaining.

The **Media Bay** (PowerBook icon with human hands pushing modules into the left and right bays) is little use, because most people have their battery permanently in the left bay and a CD or DVD drive in the right bay.

TV Mirroring (TV icon with a rabbit-ears antenna) and **Video Mirroring** (a squashed-looking monitor) allow you to turn on the mirroring functions, but they only appear when an external display is connected. TV Mirroring also allows you to switch between settings optimised for graphics or video, and to turn overscan on or off. Using overscan generally results in the edges of the screen image being hidden, but that may be preferable to a black border when playing DVDs.

Third-party CSMs

It isn't unusual for a third-party application or utility to install a CSM — examples include Conflict Catcher (used to select a particular startup set) and Virex (used to turn virus protection on or off, open a Virex component or perform an immediate scan). There are also plenty of add-on CSMs available. The following examples can be found on this month's cover CD.

Jeremy's CSM Bundle is a useful collection. It provides replacements for some of Apple's CSMs, such as a sound volume CSM that always displays the current setting. There also some extras, including a display of the free space on mounted volumes.

Another handy item is **UDF/ISO/Joliet Enabler**, a CSM that accompanies Joliet Volume Access. This software allows the Mac to use long filenames (up to 31 characters) on Windows-style Joliet format CD-ROMs, as well as providing some advantages over Apple's ISO 9660 driver. The CSM allows you to disable any of the supported file systems; for example, you can force a hybrid CD-ROM to mount using UDF rather than ISO 9660.

SuperRes displays the full range of screen resolutions and bit depths available with a particular display adaptor/monitor combination, even if they aren't all available in the Monitors control panel. The accompanying CSM allows you to select the resolution from the Control Strip.

If you like the idea of launching applications from the Control Strip, a utility called **CSM Maker** creates CSMs to open anything. Drag and drop an application onto CSM Maker, click the Create CSM button, then drag the new CSM into the Control Strip Modules folder within the System Folder. CSM Maker also has a mechanism for reinitialising the Control Strip, so you can test your new module without restarting the computer.

If you want to activate AppleScripts from the Control Strip, **ScriptStrip** is the tool you need. It's a handy way of accessing and managing scripts, and comes with some useful ones.

Finally, just as CDStrip allows you to play CD tracks without an application, **MP3 Strip** does the same with MP3 files.

Stephen Withers

Stephen Withers can be contacted at swithers@ozemail.com.au.

Mac OS shareware

CopyPaste 4.4.2

Why settle for just one clipboard? With CopyPaste you can have up to 10 sets of 10 clipboards.

Download Deputy 4.2.2

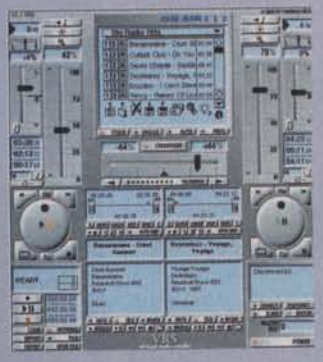
Prepare a list of all the files you want to download, then let Download Deputy do all the work.

NotePad Deluxe 2.1.1

This notepad has many of the features of a word processor, as well as a hierarchical arrangement of notes for easy reference.

On Air 2.1

An MP3 virtual radio studio or DJ mixer — the choice is up to you.



Web Devil 5.3.1

This Web site 'sucker' can download all the separate elements of a Web site for offline browsing or study.

These programs and more can be found on this month's cover CD, along with more detailed reviews.

For a complete archive of *APC* Mac OS columns, see apcmag.com.

Create a simple program for editing your school roll.

Rollin', rollin', rollin'

Last month, Practical C++ showed you how to build the CRoll class for managing a school roll. This month, find out how to build a main program to manipulate the roll.

The Add(), Find(), Delete() and Get() methods for the CRoll class were examined in previous columns, but the Read() and Write() methods are yet to be explained. The CRoll::Write() method (see listing 1) is quite a simple function, as most of the hard work is performed by the CStudent::Write() method (see listing 2). CRoll::Write() uses an iterator to loop along the m_data vector, calling the Write() method of each CStudent element in the vector. Thus, all of the CStudent objects are written to file.

This process highlights one of the strengths of object-oriented programming. The CRoll class neither knows nor cares how the CStudent::Write() method works. It is encapsulated (or hidden), making the logic of the CRoll::Write() method easy to understand and easy to debug. As long as the CStudent class has been thoroughly tested and debugged, the testing and debugging of the CRoll class becomes much easier.

Similarly, the CRoll::Read() method (see listing 1) utilises the CStudent::Read() method (see listing 2), calling it continuously until it fails. When CStudent::Read() fails, the CRoll class assumes that the end of the input file has been reached and all students have been read. In commercial systems, other error checking is also undertaken, as there are other reasons for the read to fail. For example, a disk error can occur, or the system can run out of free memory. Our example program keeps things simple and ignores these possible error conditions.

The main() attraction

Listing 3 shows the main program for our roll application: studbase.cpp. The studbase program allows you to execute transactions on the student database using the CRoll class. The general syntax is studbase verb args, where the verb can be Add, Delete or Find and args are the appropriate arguments. For instance, to add a student, use the following line of code where LName is last name, FName is first name, Addr is address, and DOB is date of birth.

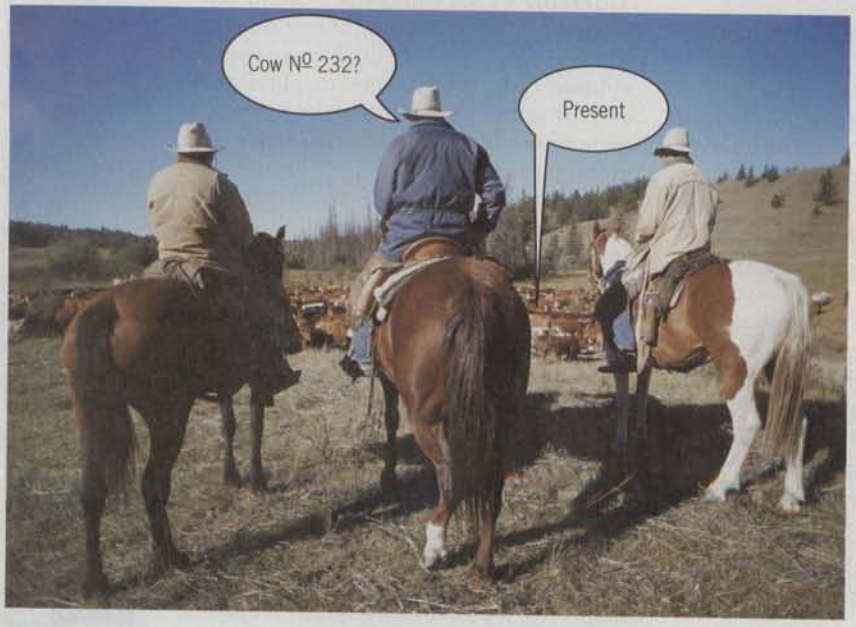
```
studbase Add LName FName Addr DOB
```

Use the following line, where StudNum is student number, to delete a student.

```
studbase Delete StudNum
```

Finally, to find a student, use the following.

```
studbase Find StudNum
```



The file studbase.cpp starts with <iostream> to declare the standard i/o stream library, and "roll.h" to declare your CRoll class (and by implication, the CStudent class). Next, you need to define four functions to be used in this program: Usage(), DoAdd(), DoDelete() and DoFind().

The main program uses the optional argc/argv arguments available in all C++ programs. The first term stands for argument count (the number of command line arguments including the program name) and argv stands for argument vector (an array of C strings representing the arguments). If you run the program studbase delete 10483 you get the following result.

```
argc = 3
        argv[0] = "studbase"
        argv[1] = "find"
        argv[2] = "10483"
```

The first thing the main() function does is make sure that the value of argc is at least 2. If you type studbase with no extra arguments, the value of argc is 1, and the program calls the Usage() function to print out help information, and then exit.

Next, you must create a CRoll object, with the file name Test.dat. When creating the object, its constructor looks for the data file and tries to open it and read in any existing student information.

The verb that tells you what to do should be the first argument, stored in argv[1] (argv[0] is the program name). All the verbs in this example start with different letters, so you only need to test the first letter of the verb, which is stored in argv[1] [0]. The toupper() function from the C standard library is used to convert the letter to uppercase. This ensures that 'Add', 'add' and 'ADD' are all treated identically.

You use a switch statement to identify the correct action: Add, Delete or Find. If the verb is none of these, the usage information is printed and the return status (rs) is set to false. Finally, print a message indicating whether the operation succeeded, then exit with the appropriate status. If rs is true, !rs is 0, otherwise it is 1.

The Usage() function has been deleted from listing 3 to save space, but the full code for this month is available on the cover CD. All the Usage() function does is print out some help information.

The DoAdd() and DoDelete() functions are quite straightforward. Each checks that the correct number of arguments are present, then calls the appropriate CRoll method. Again the encapsulation of the CRoll class makes the logic very simple. Both functions use

C++ source code

Note: Text that appears in italics is explanation only, not code.

Listing 1: Part of Roll.cpp

```
bool CRoll::Read()
{
 std::ifstream fi(m_fname.c_str());
 if (!fi)
  return false;
 CStudent s;

 while (s.Read(fi))
  Add(s);

 return m_data.size()>0;
}

bool CRoll::Write()
{
 data_t::iterator i;
 std::ofstream fo(m_fname.c_str());
 if (!fo)
  return false;

 for (i=m_data.begin();i!=m_data.end();i++)
  i->Write(fo);

 return fo.good();
}
```

Listing 2: Part of Student.cpp

```
bool CStudent::Read(std::istream &is)
{
  std::string sTmp;

  std::getline(is, sTmp);
  m_studNo = atoi(sTmp.c_str());
  std::getline(is, m_familyName);
  std::getline(is, m_otherNames);
  std::getline(is, m_address);
  std::getline(is, m_DOB);
  return is.good();
}

bool CStudent::Write(std::ostream &os)
{
   os << m_studNo     << std::endl
      << m_familyName << std::endl
      << m_otherNames << std::endl
      << m_address    << std::endl
      << m_DOB        << std::endl;
  return os.good();
}
```

Listing 3: Studbase.cpp

```
#include <iostream>
#include "roll.h"

void Usage();
bool DoAdd(CRoll &r, int argc, char *argv[]);
bool DoDelete(CRoll &r, int argc, char *argv[]);
bool DoFind(CRoll &r, int argc, char *argv[]);

int main(int argc,
      char *argv[])
{
 if (argc<2) {
  Usage();
  return 1;
 }

 CRoll r("Test.dat");
 char sel=toupper(argv[1][0]);
 bool rs=false;

 switch (sel) {
  case 'A':
          rs = DoAdd(r, argc, argv);
   break;
  case 'D':
          rs = DoDelete(r, argc, argv);
   break;
  case 'F':
          rs = DoFind(r, argc, argv);
   break;
  default:
          Usage();
          rs = false;
   break;
 }

 if (rs)
  std::cerr << "Operation completed
  successfully" << std::endl;
 else
  std::cerr << "Operation failed" << std::endl;
 return !rs;
}

static void Usage()
{
The contents of this function are omitted to save
space. See studbase.cpp on the cover CD.
}

bool  DoAdd(CRoll &r, int argc, char *argv[])
{
 if (argc!=7) {
  Usage();
  return false;
 }
 CStudent s(atoi(argv[2]),
         argv[3],
         argv[4],
         argv[5],
         argv[6] );
 return r.Add(s);
}

bool  DoDelete(CRoll &r, int argc, char *argv[])
{
 if (argc!=3) {
  Usage();
  return false;
 }
 CStudent s;
 return r.Delete(atoi(argv[2]));
}

bool  DoFind(CRoll &r, int argc, char *argv[])
{
 if (argc!=3) {
  Usage();
  return false;
 }
 CStudent s;
 bool rs = r.Find(atoi(argv[2]), s);
 if (rs)
  rs = s.Write(std::cout);
 return rs;
}
```

All these listings can be found on this month's cover CD.

the standard library function atoi() (ascii to integer) to convert the student number from the C string representation of argv to the integer representation required by the CRoll methods.

The DoFind() method is only slightly more complex. It calls the CRoll::Find() method to locate the required student. If that succeeds, it calls the CStudent::Write() method to write the student details to std::cout. This is a good example of reuse. The CStudent::Write() method is used to write to file in the CRoll::Write() method, and is also used to write the same information to the screen via std::cout.

Well, you now have a complete (but very simple) program. Next month, this column explores the encapsulation issue a little further by changing some of the implementation details. Until then, keep on coding!

Michael Smith

For a complete archive of *APC* C++ columns, see apcmag.com.

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Discover how to use serialisation to save and load abstract data objects.

An object lesson

Over recent months, this column has explored abstract data types in Java. You have used arrays to represent a bag of integers, and made a linked list to store data items. This month, discover the benefits of object serialisation and how to implement it in your programs.

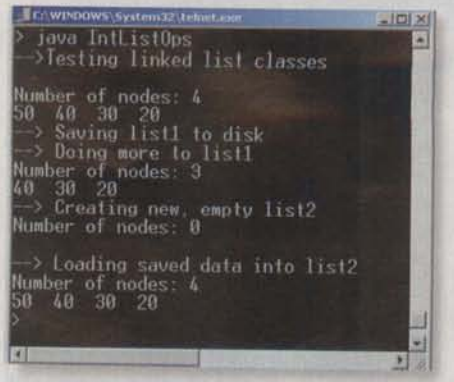
Serialisation allows your Java applets and applications to save and load the state of objects to disk or over a network. In the programs covered so far, data has been read from the keyboard and the results displayed on the screen. However, one of the most critical tasks that most applications need to perform is to save and restore data between runs of the program.

Whether it is a word processing application that saves documents to disk, a utility that remembers its configuration for next time, or a game that sets aside world domination for the night, the ability to store data for later retrieval is vital. Without it, software would be only marginally more effective than a typewriter.

The November 2000 to February 2001 instalments of this column looked at writing and reading basic Java data types, such as strings and integers, to and from a disk.

However, writing the code for saving abstract data types can be complex and repetitive. First, the programmer must create a specification for the proposed file structure. Next, they must implement save and restore functions that convert object data to and from primitive data types, and test it with sample data. If the application later requires new data to be stored, the file specification must be modified, as well as the save and restore methods.

It would be good if an abstract data type such as a linked list could be saved as easily as an integer data value, without having to iterate through all its nodes, saving each one in turn. Happily, Java provides a solution known as object serialisation. Object serialisation takes an object's state and converts it to a stream of data. Object serialisation makes it easy to take any object and make it persistent, without writing custom code to save object member variables. The object can be restored at a later time, and even a later location. With persistence, you can move an object from one computer to another, and have it maintain its state.



▲ A sample run of our program for this month

Serialising objects

Java makes it easy to serialise objects. Any object whose class implements the java.io.Serializable interface can be made persistent with only a few lines of code. No extra methods need to be added to implement the interface; its purpose is to identify at runtime which classes can be safely serialised and which cannot. You only need to add the implements keyword to the class declaration to identify the classes that are serialisable, as follows.

```
public class UserData
        implements java.io.Serializable
```

Once a class is serialisable, you can write the object to any OutputStream, such as to disk. To do this, you must first create an instance of java.io.ObjectOutputStream, and pass the constructor an existing OutputStream instance. For example, use a FileOutputStream to send data to a file called myobject.data.

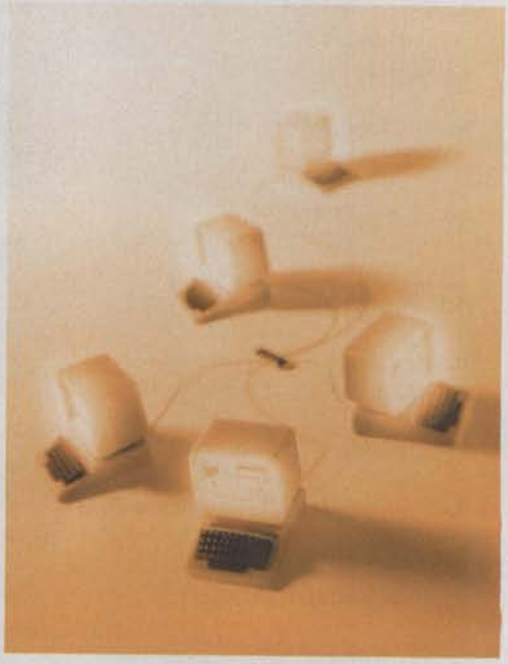
```
FileOutputStream f_out = new
        FileOutputStream ("myobject.data");
```

Then use an ObjectOutputStream to send object data to the FileOutputStream for writing to disk.

```
ObjectOutputStream obj_out = new
        ObjectOutputStream (f_out);
```

Finally, pass the object to the ObjectOutputStream's writeObject() method to cause it to be written out to disk.

```
obj_out.writeObject (myObject);
```



So, in three lines of code you have written myObject, which you can consider to be just any arbitrary object, out to a disk file.

Note that any Java object that implements the serialisable interface can be written to an output stream this way, including those that are part of the Java API. Any objects that are referenced by a serialised object will also be stored. This means that arrays, vectors, lists and collections of objects can be saved in the same fashion, without the need to manually save each item individually.

Restoring objects from a serialised state

Once you've saved your data type to a file, you need to be able to read it back in again. Reading objects back is almost as easy as writing them. The only catch is that at runtime the Java runtime engine can never be completely sure what type of data to expect. A data stream containing serialised objects may contain a mixture of different object classes, so Java reads data back as generic java.lang.Object types. You then need to cast this generic object explicitly to a particular class. If you've never cast an object before, the procedure is relatively straightforward — you are just telling Java that a specific set of data should be interpreted as an instance of a specific data type or class.

You do this by checking the object's class, using the 'instanceof' operator, and then casting to the correct class. First, read from the disk using the File-InputStream.

```
FileInputStream f_in = new
      FileInputStream ("myobject.data");
```

Then read it using the ObjectInputStream.

```
ObjectInputStream obj_in = new
      ObjectInputStream (f_in);
```

Read the object.

```
Object obj = obj_in.readObject ();
```

Is the object an instance of the Vector class, for example?

```
if (obj instanceof Vector)
{
```

Cast the object to a Vector.

```
 Vector vec = (Vector) obj;
```

Then do something with the vector:

```
}
else
```

unless the object is some other type.

Further issues with serialisation

As you can see, it's relatively easy to serialise an object. Whenever new fields are added to an object, they will be saved automatically, without requiring modification to your save and restore code.

However, there are some cases where this behaviour is not desirable. For example, a password member variable might not be safe to transmit to third parties over a network connection, and might need to be left blank. In this case, the transient keyword can be used. The transient field indicates that a particular member variable should not be saved. It's not used often, but it's an important keyword to remember.

```
public class UserSession
      implements java.io.Serializable
{
 String username;
 transient String password;
}
```

Our sample program

This month, the sample program takes the linked list from last month and adds serialisation. IntNode.java and IntList.java have only had to be changed once each to add an implementation. Both classes need to be serialisable, because the list is made up of nodes; to save the list, it needs to be able to save each node.

In the test program IntListOps.java, a list (list1) is built with four data items. It is then serialised to a disk file. Next, the first item from list1 is deleted and its contents are displayed onscreen so you can see that this has really happened. Now a new list instance, list2, is created. This has no items and its contents are displayed to prove this. Using serialisation, the saved data is loaded into list2, thus populating it. Finally, the contents of list2 are displayed and you can see that it has four data items, in the same order as they previously appeared.

Summary

Java's support for object serialisation makes the implementation of persistent objects extremely easy. It is possible to write your own serialisation mechanism, but the simplicity of the one provided by Java is hard to beat.

Serialisation benefits programmers in a number of ways. It reduces the time taken to write code for the saving and restoration of object or application states. It eliminates the complexity of save and restore operations, avoiding the need to create a new file format. It also makes it easier for objects to travel over a network connection.

Applets also benefit from serialisation. Rather than specifying a long list of parameters, or performing time-consuming initialisation and parsing, an applet can just reload a configuration object whose member variables contain all the information needed to execute it.

With a little imagination, serialisation might just have a place in your next project.

David Williams

David Williams can be contacted at david.williams@altitude.com

Java source code

Listing 1: IntNode.java

```
class IntNode implements java.io.Serializable
{
 private int data;
 private IntNode link;
 public IntNode (int initialData, IntNode initialLink)
 {
  data = initialData;
  link = initialLink;
 }
 public int getData ()
 {
  return data;
 }
 public void setData (int newData)
 {
  data = newData;
 }
 public IntNode getLink ()
 {
  return link;
 }
 public void setLink (IntNode newLink)
 {
  link = newLink;
 }
}
```

Listing 2: IntList.java

```
class IntList implements java.io.Serializable
{
 int numNodes;
 IntNode head;
 public IntList ()
 {
  head = null;
  numNodes = 0;
 }
 public void insertAtHead (int item)
 {
  IntNode aNode = new IntNode (item, head);
  numNodes++;
  head = aNode;
 }
```

Java source code (continued)

```
public boolean insertAfter (int target, int newValue)
{
  if (numNodes == 0)
    return false;
  IntNode aNode = head;
  while (aNode != null)
  {
    if (aNode.getData () == target)
    {
      IntNode inNode = new IntNode (newValue, aNode.getLink ());
      aNode.setLink (inNode);
      numNodes++;
      return true;
    }
    aNode = aNode.getLink ();
  }
  return false;
}
public boolean deleteElement (int target)
{
  if (numNodes == 0)
    return false;
  IntNode currNode = head;
  IntNode nextNode = head.getLink ();
  if (nextNode == null)
    head = null;
  while (nextNode != null)
  {
    if (nextNode.getData () == target)
    {
      currNode.setLink (nextNode.getLink ());
      numNodes--;
      return true;
    }
    currNode = currNode.getLink ();
    nextNode = nextNode.getLink ();
  }
  return false;
}
public boolean removeFromHead ()
{
  if (numNodes == 0)
    return false;
  head = head.getLink ();
  numNodes--;
  return true;
}
public void showList ()
{
  System.out.println ("Number of nodes: " + numNodes);
  IntNode aNode = head;
  while (aNode != null)
  {
    System.out.print (aNode.getData () + " ");
    aNode = aNode.getLink ();
  }
  System.out.println ();
}
}
```

Listing 3: IntListOps.java
Some simple list operations, including serialisation.

```
import java.io.*;
public class IntListOps
{
  public static void main (String[] args)
  {
    System.out.println ("-->Testing linked list classes\n");
    IntList list1 = new IntList ();
    list1.insertAtHead (20);
    list1.insertAtHead (30);
    list1.insertAtHead (40);
    list1.insertAtHead (50);
    list1.showList ();
    System.out.println ("--> Saving list1 to disk");
    try
    {
      FileOutputStream f_out = new FileOutputStream ("list.data");
      ObjectOutputStream obj_out = new ObjectOutputStream
(f_out);
      obj_out.writeObject (list1);
    }
    catch (Exception e)
    {
      System.out.println (e.toString ());
      System.exit (1);
    }
    System.out.println ("--> Doing more to list1");
    list1.removeFromHead ();
    list1.showList ();
    System.out.println ("--> Creating new, empty list2");
    IntList list2 = new IntList ();
    list2.showList ();
    System.out.println ("--> Loading saved data into list2");
    Object obj = new Object ();
    try
    {
      FileInputStream f_in = new FileInputStream ("list.data");
      ObjectInputStream obj_in = new ObjectInputStream (f_in);
      obj = obj_in.readObject ();
    }
    catch (Exception e)
    {
      System.out.println (e.toString ());
      System.exit (1);
    }
    if (!(obj instanceof IntList))
    {
      System.out.println ("Hmm, list.data does not hold a list!");
      System.exit (1);
    }
    list2 = (IntList) obj;
    list2.showList ();
  }
}
```

For a complete archive of *APC* Java columns, see apcmag.com.

Find out how to use HTML and Flash forms to send email from PHP.

PHP email in a Flash

Last month, Insite showed you how to use PHP to store information submitted by your site visitors in a database. This month, find out how to send email from PHP using Macromedia Flash. If you don't have Flash, you can send email using an HTML page instead. All the examples used this month are included on the cover CD.

Get up and running

PHP is processed server side, so you need Web server software as well as PHP on your computer. Installation instructions are included with PHP and are also available at php.net. Once you have PHP running, you also need to configure it to send email. If you use Linux, you must define the location of sendmail in the configuration file. Windows users need to specify the mail server and sending email address in the C:\Windows\php.ini file as shown in the box below.

```
[mail function]
SMTP = mail.yourmailserver.com          ; win32 only
sendmail_from = me@myaddress.com        ; win32 only
;sendmail_path =                        ; unix only, supports arguments
                                        ; (default is sendmail -t)
```

Create the HTML form

The first page you need to build is a simple HTML form with three input fields and a submit button. Two of the fields are single-line text input boxes used to collect the visitor's name and email address. The third is a text area where the visitor can type a message. Example code for this page is given in listing 1, and figure 1 shows what it might look like. The action for this form is sendmail.php.

Create the sendmail page

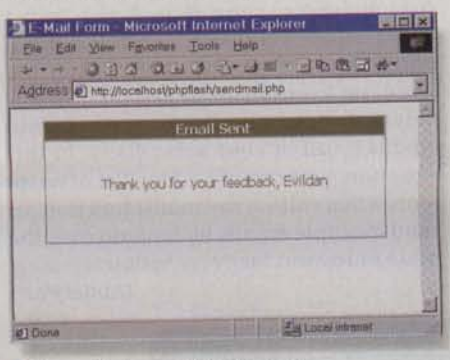
The code for the sendmail.php page is given in listing 2. The first line of this page creates a variable called $datetime that takes the current time using the built-in PHP time() function and formats it using the date() function. Next, the variable $mailmsg is created to store the contents of the email to be sent. A few things happen here. First, PHP recognises \n and \t inside text strings and replaces them with line breaks and tab characters respectively. Second, the form variables name, email and message are recognised as $name, $email and $message and inserted into the new $mailmsg variable where they appear. Third, the syntax $mailmsg .= "text to append" is used as shorthand for $mailmsg = $mailmsg . "text to append". Note that in PHP, a full stop is used to join text strings together.

Once the mail message has been constructed, two more variables are used to store the mail recipient's address and the subject of the message: $to and $subject. Modify these to suit your needs. Next, a $mailheaders variable is created to specify who the email is from, and the reply address for it.

The email is sent by calling the PHP mail() function and passing it the recipient, subject, message and headers all at once. Finally, some feedback is provided so that the visitor knows the email has been sent (see figure 2).



▲ Figure 1: The HTML form



▲ Figure 2: The email results page

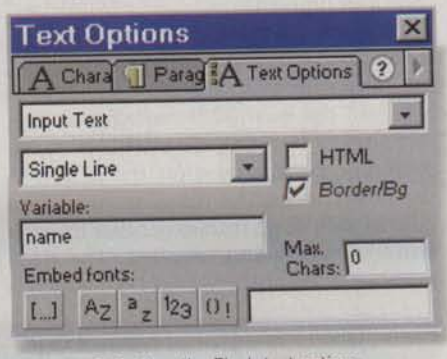


If you get a message such as Warning: Failed to Connect when you submit your email form, check that you are connected to the Internet (or at least to your mail server) and that you have configured your mail settings as described earlier.

Create a Flash form

Macromedia Flash forms can be built to behave in the same way as HTML forms. The minimum requirements are the same: three text input fields and a submit button. For the text fields, use regular text objects with the border turned on and the text type set to Input Text, as shown in figure 3.

For the name and email fields, you can set the text object to single line, but the message field should be set to multiline. Make sure that you set the variable attributes for these fields to name, email and message, just as you did in the HTML



▲ Figure 3: Setting the Flash text options

Insite source code

Listing 1 : The HTML form (index.html)

```
<HTML>
<HEAD><TITLE>Email Form</TITLE></HEAD>
<BODY>
<FORM method="POST" action="sendmail.php">
Name:   <INPUT type="text" name="name" size=30>
Email:  <INPUT type="text" name="email" size=30>
Message:
<textarea name="message" cols=25 rows=5></textarea>
<INPUT type="submit" value="Send Email">
</FORM>
</BODY>
</HTML>
```

Listing 2 : The Action page (sendmail.php)

```
<?php
$dateTime = date("d-m-Y H:i:s", time());

$mailmsg= "\nEmail from    :\t$name\n";
$mailmsg .= "Return email  :\t$email\n";
$mailmsg .= "Sent at       :\t$dateTime\n";
$mailmsg .= "Message       :\t$message\n\n";

$to = "you@youraddress.com";
$subject = "Website Email Message";

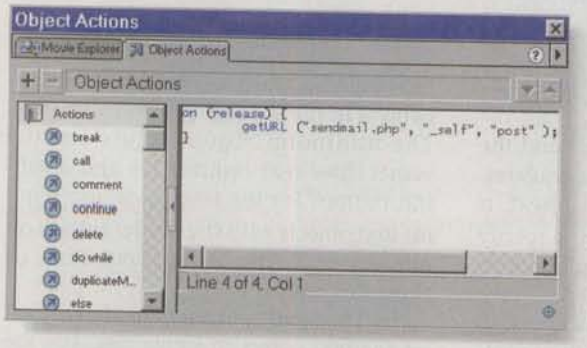
$mailheaders = "From: YourSite.com <> \n";
$mailheaders .= "Reply-To: $email\n\n";

mail($to, $subject, $mailmsg, $mailheaders);
echo "Thank you for your feedback,$name";
?>
```

Listing 3: The Flash page (flashmail.html)

```
<object
 classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
 width="214" height="210" align="middle">
 <param name=movie value="sendmail.swf">
 <param name=quality value=high>
 <embed src="sendmail.swf" quality=high
 type="application/x-shockwave-flash"
 width="214" height="210" align="middle">
 </embed>
</object>
```

For the complete code for all the pages used here, check this month's cover CD.



▲ Figure 4: Action for the send button

form. To complete the form, add a button and give it a 'release' action of GetURL, as shown in figure 4.

In Flash, the GetURL function accepts three parameters: the URL to connect to, the target browser frame or window to use, and the method by which parameters are to be sent. The URL is sendmail.php, as was used for the action in the HTML form. The target frame in this case is _self, as no frames or other browser windows are being targeted. The final parameter should be set to POST, which is standard for forms, but GET can also be used. The GET method passes all the variables in the query string. This limits the number of characters in the form to less than 256, so POST is a better option in this case.

Suggestions

The Flash and HTML forms can be used to pass the form variables to a Perl script or an ASP or ColdFusion page instead of a PHP page. However, sending email from PHP is much more straightforward than from Active Server Pages, where you need to install a third-party object to do the work. Using the database example from last month, this month's code can also be used to send emails to all of your subscribers. In this situation, you can use a long list of recipients when calling the mail() function, or send multiple emails by looping over the mail() function for every visitor.

Daniel Potts

Online resources

PHP distributions
www.php.net

PHP documentation
php.net/docs.php

PHP FAQ
php.net/FAQ.php

Apache for Windows
www.apache.org/dist/binaries/win32

Apache for Linux
www.apache.org/dist/binaries/linux

General PHP resources
php.resourceindex.com
www.zend.com
www.phpwizard.net
www.phpbuilder.com

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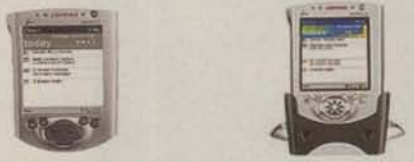
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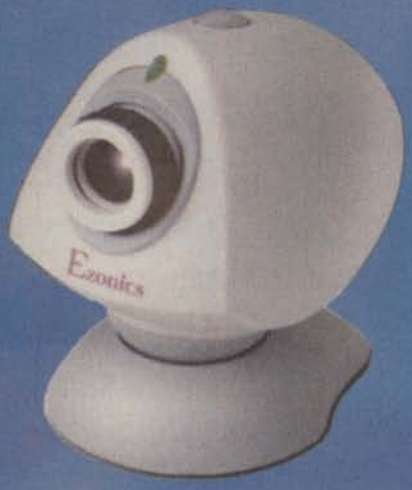
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HP Desk Jet 400/500 Series	6	8A-BKL
HP Desk Jet 600/660/690 Series	6	8B-BKL
HP Desk Jet 700/800/900/1000 Series	8	29-BKL
HP Desk Jet 300 Series & Olivetti JP's!	8	7-BKL
EPSON Stylus 400/800/800+/1000	8	1-BKL
EPSON Stylus Colour /PRO/XL	12	2-BKL
EPSON Stylus 820/colour II/IIs	12	23-BKL
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	12	33A-BKL
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AMD Duron 700 (oem) (Socket A)	$125
AMD Duron 750 (oem) (Socket A)	$148
AMD Duron 800 (oem) (Socket A)	$185
AMD Duron 850 (oem) (Socket A)	$242
AMD Athlon K7- 900T 3D (oem) (Socket A)	$330
AMD Athlon K7- 950T 3D (oem) (Socket A)	$366
AMD Athlon K7- 1000T 3D (oem) (Socket A)	$425
AMD Athlon K7- 1000T 3D (Retail) (Socket A)	$479
AMD Athlon K7- 1100T 3D (oem) (Socket A)	$519
AMD Athlon K7- 1200T 3D (oem) (Socket A)	$606

MOTHERBOARDS

Transcend AVD1 (VIA, Slot-1, PC133)	$145
Abit SE6 (815, S370, VGA,Audio,U-100,133)	$290
Abit BX133-RAID (BX, S370, U-100, RAID)	$255
Abit KT7A (VIA, Soc-A)	$317
AOpen AK33 (VIA, Soc-A, Audio, AGP 4x)	$234
Asus CUSI-M (SiS, S370, M-ATX, VGA, LAN, Audio)	$182
AsusCUSL2(815,S370,U-100,VGA,AGP Pro4x)	$321
Asus CUSL2-C(815,S370,U-100,AGP Pro4x)	$269
Asus CUV-4X (VIA, S370, AGP Pro 4x, 133)	$230
Asus A7V (VIA, Soc-A, U-100)	$308
Asus A7V133 (VIA, Soc-A, U-100)	$317
Asus K7V-T (VIA KX133, Slot-A, U-66)	$296
Asus A7V266 (VIA, Soc-A, U-100)	$420
FIC AZ11 (VIA, Soc-A, Audio, ATX, U-66)	$263

MEMORY

64MB PC133 SDRAM 168pin (HY/MT)	$66
128MB PC133 SDRAM 168pin (HY/MT)	$131
256MB PC133 SDRAM 168pin (HY/MT)	$248
64MB PC100 SDRAM 168pin (oem)	$51
128MB PC100 SDRAM 168pin (oem)	$96
64MB PC133 SDRAM 168pin (oem)	$55
128MB SDRAM PC150 168pin (oem)	$229

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64MB Rambus RDRAM RIMM 800Mhz ECC	$350
128MB Rambus RDRAM RIMM 800Mhz ECC	$660

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15Gb Seagate Barracuda 2M 7200	$221
20Gb Seagate Barracuda 2M 7200	$240
30Gb Seagate Barracuda 2M 7200	$323
30Gb 75GXP IBM Deskstar U-100 2M 7200	$319
45Gb 75GXP IBM Deskstar U-100 2M 7200	$381
60Gb 75GXP IBM Deskstar U-100 2M 7200	$474
75Gb 75GXP IBM Deskstar U-100 2M 7200	$737
10Gb Quantum FB LCT20 U-100	$191
20Gb Quantum FB LCT20 U-100	$224
20Gb Quantum FB AS U-100 2M 7200	$246
30 Gb WD Caviar U-100 5400	$257
45 Gb WD Caviar U-100 5400	$368
20Gb WD Caviar U-100 7200	$251
30Gb WD Caviar U-100 7200	$308
40Gb WD Caviar U-100 7200	$383

HARD DISKS - SCSI

9Gb Quantum Atlas V U-160 LVD68	$396
18Gb Quantum Atlas V U-160 LVD68	$602
36Gb Quantum Atlas V LVD68	$939
9Gb Quantum Atlas 10K II U-160 LVD68	$466
18Gb Quantum Atlas 10K II U-160 LVD68	$635
36Gb Quantum Atlas 10K II U-160 LVD68	$1,133
73Gb Quantum Atlas 10K II U-160 LVD68	$2,581
9.2Gb Seagate Barracuda LVD68	$434
18.4Gb Seagate Barracuda U-160 LVD68	$604
9.2Gb Seagate Cheetah LVD68 10,000rpm	$504
18.4Gb Seagate Cheetah LVD68 10,000rpm	$668
18Gb Seagate Cheetah LVD68 15,000rpm	$959
9Gb IBM Ultrastar 36LZX U-160 10k LVD68	$452
18Gb IBM Ultrastar 36LZX U-160 10k LVD68	$686
36Gb IBM Ultrastar 36LZX U-160 10k LVD68	$1,180

FDD & STORAGE DEVICES

1.44MB, 3.5" Floppy Disk Drive	$28
100M Zip Int. IDE (oem)	$100
Iomega 100M Zip Ext. USB	$230
Iomega 250M Zip Int. IDE (oem)	$199
Iomega 250M Zip Ext. USB	$395
Iomega 250M Zip Ext. USB&PCMCIA	$431
ORB 2.2GB Int. IDE Drive (oem)	$297
ORB 2.2GB Int.SCSI Drive (oem)	$312
ORB 2.2GB Ext.SCSI Drive (retail)	$400
ORB 2.2GB Ext. USB Drive (retail)	$458

VIDEO & GAMES CARDS

4M Eagle S3 Trio 32/2X AGP VGA Card	$50
8M Eagle Trident AGP VGA Card	$55
16M Eagle TNT2 Vanta AGP	$80
32M Eagle TNT2 Vanta AGP	$107
32M TNT2 M64 AGP w/ TV Out	$133
32M TNT2 M64 PCI	$132
32M TNT2 M64 PCI w/ TV Out	$172
32M Eagle Geforce II MX	$193
32M Asus V7100 GeForce II MX TV Out	$251
32M Asus V7100 GeForce II MX 2VID	$301
32M Asus V7700 GeForce II GTS DDR Pure	$515
32M AsusV7700GeForceII GTSDDR TVTuner	$640
32M AsusV7700GeForceIIGTSDDR Deluxe	$482
64M Asus V7700 GeForce II GTS DDR Pure	$657
64M Asus V7700 GeForce II GTS DDR Deluxe	$716
64M Asus V7700 GeForce II GTS DDR Ultra	$985
32M ATI Rage Fury Pro AGP VIVO (oem)	$255
32M ATI Rage Fury Pro AGP VIVO (Retail)	$287
64M ATI Rage Fury MAXX AGP	$255
32M ATI Radeon DDR AGP (oem)	$253
64M ATI Radeon DDR VIVO AGP (oem)	$721
32M Creative Blaster GeForce PRO DDR	$499
32M Creative Blaster GeForce II GTS	$533
64M Creative Blaster GeForce II Ultra	$908
32M Leadtek Winfast GeForce II MX (oem)	$237
32M Leadtek Winfast GeForce II MX	$282
32M Leadtek Winfast GeForce II MX Dual Head TV	$370
32M Leadtek Winfast GeForce DDR (retail)	$426
32M Leadtek Winfast GeForce II GTS TV (retail)	$483
64M Leadtek Winfast GeForce II GTS TV (retail)	$752
64M Leadtek Winfast GeForce II GTS TV Pro	$853
64M Leadtek Winfast GeForce II GTS TV Ultra	$1,041
16M Millenium G450 Dual Head DDR 360Mhz (oem)	$265
32M Millenium G450 Dual Head DDR 360Mhz (oem)	$357
32MB Hercules 3D Prophet w/ TV Out	$394
32MBHercules3DProphetDDR-DVI(TV+Flat Pnl)	$487
32MB Hercules 3D Prophet II MX	$245
32MB Hercules 3D Prophet II MX Dual Display Video	$311
64MB Hercules 3D Prophe IIGTSPROTVOut	$573
64MB Hercules 3D Prophet II Ultra (TV+DVI)	$877
16M 3Dlabs Oxygen VX1 Glint R3 AGP	$251

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Mitsubishi D/view 1554R 15" ,24 1024x768	$266
Mitsubishi D/view 1770F 17", 27	$389
Mitsubishi D/view 1772if 17", 26	$510
Mitsubishi D/view 1995SL 19"	$749
Acer 771 17", 27 1280x1024 60Hz	$386
Acer 99C 19", 26 1600x1200 75Hz	$840
Acer 211A 21", 26 1600x1200 75Hz	$1,546
Hitachi CM615 17", 24 1280x1024	$395
Hitachi CM625 17" (Flat Trinitron)	$658
Hitachi CM715 19", 22 1600x1200	$771
Hitachi CM771 19", 22 1800x1350 (Flat)	$878
Hitachi CM772 19", 22 1800x1350 (Flat)	$972
Hitachi CM811 21", 22 1600x1280	$1,541
Hitachi CM813 21", 22 1600x1280	$1,622
LG SW552V Studioworks 15"	$253
Panasonic E70i 17" Digital Color 0.27	$433
Panasonic SL95 19" Digital Color 0.27	$1,016
Sony E220 17", 24-.25 (Flat Trinitron)	$721
Sony G400 19", 24-.25 (Flat Trinitron)	$1,246
Sony G500 21", 24 (Flat Trinitron)	$1,936
Viewsonic PS775-2E 17", 26 1600x1200	$583
Viewsonic PF775 17", 25 1600x1200 Flat	$700
Viewsonic E70 17", 27 1280x1024	$385
Viewsonic M70 17", 27 1280x1024 MM	$451
Viewsonic E790 19", 26 1600x1280	$825

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Acer FP450 14" LCD	$1,441
Acer FP55B 15" LCD (Speaker + USB)	$1,860
Hitachi DT3141 14.1" TFT Monitor	$1,725
Hitachi CML150XE 15" TFT Monitor	$1,725
Hitachi CML151XW 15" TFT Monitor	$1,608
Hitachi CML170SXW 17" TFT Monitor	$2,846
LG 15" SW570LS LCD Monitor	$1,724
Keycorp 12.1" DSTN Monitor	$899
Panasonic 15" LC50S LCD 0.25+USB+Spkers	$1,995
Panasonic 19" LC90S LCD 0.25+USB+Spkers	$7,248
Sony 15" SDMM51 TFT Monitor	$2,308
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Viewsonic 15" LCD VE150 1024x768	$1,663

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Macase Midi Tower ATX KA-580WP 250W	$127
Macase Midi Tower ATX KA-580WP 300W	$140
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Macase Server Tower ATX KA066 (1X300W)	$481
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Logitech Cordless Wheel Mouse PS/2 (oem)	$80
Logitech Cordless MouseMan Wheel PS/2	$108
Microsoft Intellimouse PS/2 (oem)	$44
Microsoft Intellimouse Optical USB&PS/2	$84

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44x IDE ATAPI CD-ROM Drive	$67
52x Creative IDE CD-ROM Drive	$80
32x Teac SCSI CD-ROM Drive	$164
24x Teac PCMCIA External (Notebook)	$319
Pioneer 16x DVD 40xR IDE Bare Drive (OEM)	$199
Creative EncoreKit12xDVD+MPEGCard (retail)	$477

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Plextor (12x10x32) IDE + Soft + Media	$721
Plextor (12x4x32) SCSI + Soft + Media	$766
HP 9140i (8x4x32) IDE	$389
HP 9350i (10x4x32) IDE	$463
HP 9500i (12x8x32) IDE	$556
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Acer (4x4x6) Ext USB	$451
Ricoh 7120A (12x10x32) IDE Kit 4m Buffer	$380
Ricoh 7125A (12x10x32) IDE Kit	$400
Ricoh 9120A (12x10x32x8) IDE DVD-CDRW	$581
Sony 145E (10x4x32) IDE Bare Drive (OEM)	$363
Sony 145S (10x4x32) SCSI Bare Drive (OEM)	$427
Sony 160E (12x8x32) IDE Bare Drive (OEM)	$472
Panasonic (8x4x32) IDE + Soft (OEM)	$349
Iomega Zip (12x10x32) Int IDE	$505
Iomega Zip (4x4x6) Ext USB	$470
Yamaha (8x4x24) SCSI Bare Drive (OEM)	$391
Yamaha (8x4x24) SCSI + Soft + Media	$445
Adaptec Toast V3.5.2 (Macintosh)	$176
Blank CD-RW Laser	$2
Blank CD-RW Ricoh	$5

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Sound Blaster Vibra 128 (oem)	$26
Sound Blaster PCI-128 2-Channel (oem)	$46
Sound Blaster LIVE (oem)	$55
Sound Blaster LIVE DE 5.1	$113
Sound Blaster LIVE Platinum 5.1	$191
Guillemot Maxi Soundmuse	$449
Diamond Monster Sound MX400 (oem)	$75
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Altec Lansing ACS22 - 2p	$60
Altec Lansing ACS233 - 3p	$79
Altec Lansing ACS45.1 Power Cube - 3p	$165
Altec LansingATP3 Flatpanel-3p(multi-chan)	$215
Altec Lansing ACS56 Gamers -5p Digital in	$265
Altec Lansing ACS48 Power Cube + - 3p	$265
Altec Lansing ADA880 Dolby AC3 - 5p	$488
Cambridge PCWorks 3-p	$90
Cambridge FPS1000 4-p Surround	$153
Cambridge FPS1500 4-p Surround Digital	$191
Cambridge FPS2000 4-p Surround Digital	$375
Cambridge DTT2500D 6-p Desktop Theater	$634
Yamaha YST/20 Digital Surround Speakers	$116

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Samsung ML-4500 8ppm 600dpi	$431
Samsung ML-5200A 10ppm 1200dpi (+USB)	$602
Canon BJC-1000SP	$120
Canon BJC-2100SP 5ppm	$148
Canon BJC-3000 (+USB)	$239
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Epson Stylus Photo 1270 (A3+)	$838
Epson Stylus Photo 2000P (A3+)	$1,797
Lexmark Z11 Colour (1200x1200)	$132
Lexmark Z31 Colour (1200x1200)	$162
HP Deskjet 640C	$178
HP Deskjet 840C	$271
HP Deskjet 930C	$322
HP Deskjet 950C	$439
HP Deskjet 970Cxi	$708
HP LaserJet 1100 8ppm	$708
HP LaserJet 2100	$1,289
HP LaserJet 2100M	$1,464
Kyocera FS-1000	$623
Kyocera FS-1200	$1,046
Kyocera FS-1750	$1,595
Panasonic KX-P6100	$308
Xerox DocuPrint P8ex 8ppm	$415
Xerox DocuPrint P1202 12ppm	$689
Xerox WorkCentre 385 4-in-1 Laser	$986

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Acer 620S SCSI (600x1200)	$161
Acer ScanWit 2720S Film Scanner	$602
Agfa Snapscan E20 USB (600x1200)	$213
Agfa Snapscan E40 USB (1200x2400)	$345
Agfa Snapscan E50 + 35mmFilm(1200x2400)	$416
Mitsubishi DV648U USB (600X1200)	$131
Umax Astra 2100U 36-Bit (600x1200)	$113
Canon CanoScan N340P (300x600)	$115
Canon CanoScan N640P (600x1200)	$140
Canon CanoScan N650U USB (600x1200)	$180
CanonCanoScanD660U USB+35mm(600x1200)	$279
Canon CanoScan N1220U USB (1200x2400)	$284
Canon CanoScanFB1200USB(1200x2400)	$441
Epson Perfection 640 USB (600x2400)	$280
Epson Perfection 1240 USB (1200x2400)	$464
Epson Perfection 1640SU SCSI&USB(16x32)	$561
Epson GT-7000 USB (600x1200)	$386
HP ScanJet 3300C USB	$192
HP ScanJet 5300C USB	$461
Plustek OpticPro 1248U (600x1200) USB	$113
Plustek OpticPro U12B (600x1200) USB	$122
Microtek V6 USL A4 42-Bit USB&SCSI	$375
Microtek X12 USL (1200x2400) USB&SCSI	$584
Microtek Scanmaker 4 SCSI (Trans)	$1,279

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56K V90 Fax Modem Internal Web Excel	$56
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Netcomm InModem 56K V90 Int. PCI (oem)	$64
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Sony Mavica MVCFD85 Digital Camera	$1,398
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Sony Mavica MVCCD1000 Digital Camera	$2,558
Sony Cybershot DSCS30 Digital Camera	$1,088
Sony Cybershot DSCS70 Digital Camera	$1,881
Sony MavicapCameraDevice for TV/Camcorder	$1,035

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Dynalink TV Tuner PCI	$107
Dynalink TV Tuner PCI + FM Radio	$120
Hauppauge WinTV GO PCI	$186
Hauppauge WinTV GO FM PCI	$201
Hauppauge WinTV Radio PCI	$301
Hauppauge WinTV USB	$251

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Creative VB WebCam 3 USB	$147
Creative VB WebCam Go Plus	$301
Kodak DVC-325 Digital Video Camera USB	$157
Logitech QuickCam Express USB (oem)	$90
Logitech QuickCam Pro 3000	$235
Logitech QuickCam Web	$187

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Pinnacle Miro Studio DC10 +	$559
Pinnacle Miro Studio DV	$306
Pinnacle Miro Studio DV Plus	$534
Pinnacle Miro Video DV200	$1,402
32M Matrox RT2000 Kit	$2,626
Canopus EZDV	$564
Canopus EZDV Plus w/ Ulead MSP6.0	$752
Canopus DVStorm w/ Internal Bay (No Prem)	$3,254
Canopus DVStorm MPEG HW Module	$1,147

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Promise U-100 + Cable (oem)	$95
Promise Fastrak-66 IDE RAID Array 0/1	$156
Adaptec 2904 PCI	$115
Adaptec 2930 U PCI Kit	$221
Adaptec 19160 PCI U-160 1xchnl 32-Bit Card (oem)	$354
Adaptec 19160 PCI U-160 1xchnl 32-Bit Kit	$510
Adaptec 2100S U-160 RAID 1-Channel (Kit)	$976

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Exabyte TR4 4-8G IDE	$286
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Seagate Scorpion 2/4GB DAT DDS-DC	$893
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Skymaster 10M Combo PCI	$24
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D-Link DFE-530TX 10/100M PCI Ethernet	$60
3Com 3C905B 10/100M PCI Ethernet (OEM)	$87
Intel 8460B 10/100M PCI Ethernet (oem)	$96
NetGear FA311TX 10/100M PCI (oem)	$45

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Swann Smart 4-Port Powered Hub	$71
Accton 8-p 10M Hub (oem)	$64
Accton 16-p 10M Hub (oem)	$149
Accton 4-p 10/100M Switching Hub	$198
Accton 8-p 10/100M Switching Hub	$238
Accton 16-p 100M Hub	$1,159
D-Link8-Port10/100N-WaySwitch(DES-1008D)	$320
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APC Backup Pro 1000	$722
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APC Smart-UPS 700 & Powerchute+	$678
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APC Smart-UPS 2200 & Powerchute+	$2,084
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Liebert Powersure Personal 300VA Off-Line	$172
Liebert Powersure Personal 500VA Off-Line	$243
Liebert Powersure ProActive 350VA UPS	$282
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LiebertPowersureInteractive3000VRackUPS	$3,072
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Liebert Upstation GXTR 1000VA Online UPS	$1,668
Liebert Upstation GXT 1500VA Online UPS	$1,756
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Liebert Upstation GXT 3000VA Online UPS	$3,449
Liebert Upstation GXT 6000VA Online UPS	$5,930
Liebert Upstation GXT 10000VA Online UPS	$8,853
Liebert PS700 + PSP300	$818
Liebert PS700 + PSP300 X 10	$2,062
Liebert PS700 + PSP300 X 5	$1,371
Liebert PS700 + PSP500 + SNMPE3	$1,394
Liebert PS700 + PSP500 X 10 + SNMPE3	$3,243
Liebert PS700 + PSP500 X 5 + SNMPE3	$2,216
Liebert 12 Months Labour Warranty GXT6/10	$215
Liebert 4-Way MultiPort Interface Unit	$309
Liebert 8-Way MultiPort Interface Unit	$944
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- Microsoft Intellimouse PS/2
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Illustration with optional TFT monitor

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- Creative Sound Blaster Live! Soundcard
- Altec Lansing ACS233 3-p Stereo Speakers
- 56K V90 Internal Fax/Data Modem
- Windows 98 / Millennium installed & conf.

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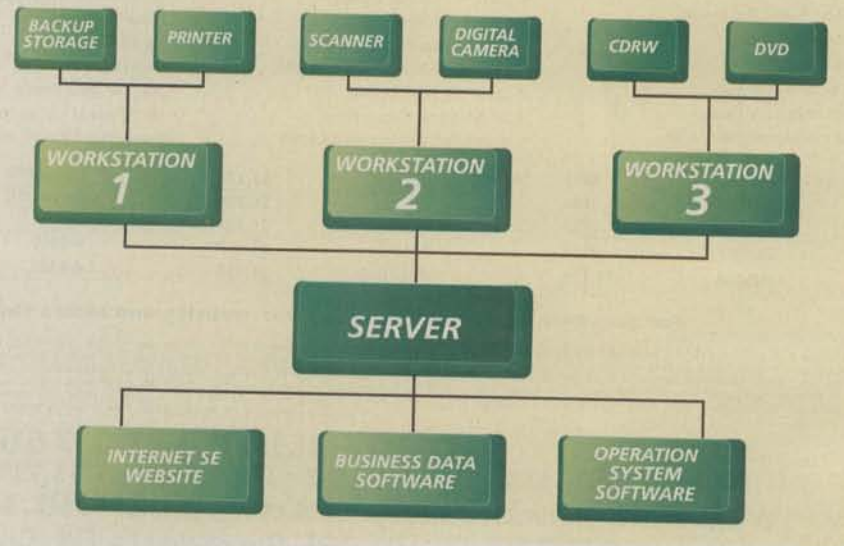
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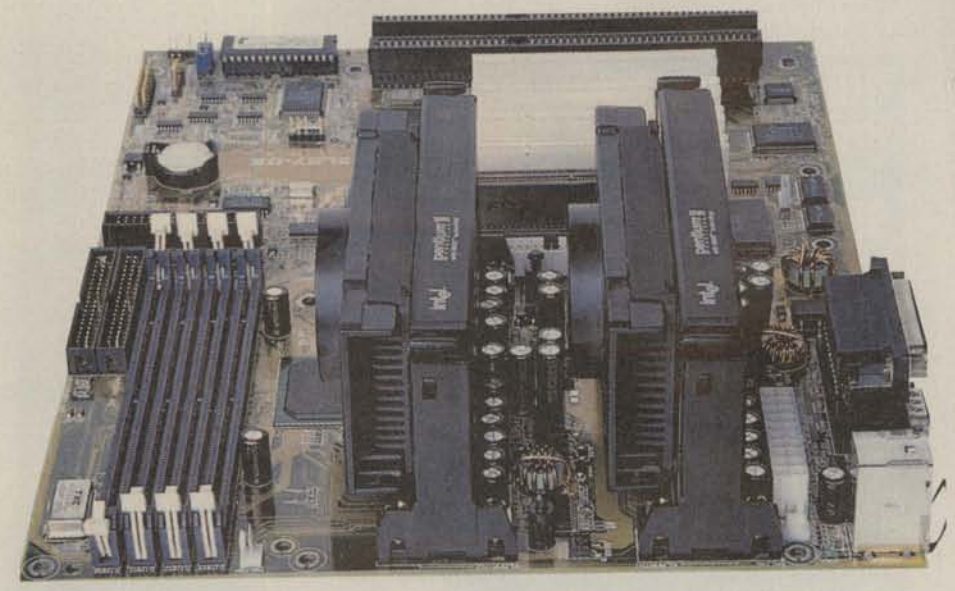
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Gigabyte 6VXC7-4X M/B
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20GB Hard Drive Seagate
3.5" FDD Panasonic
8Mb S3 AGP SVGA Card
Deluxe Tower ATX Case
PS II Keyboard & Mouse
15" Acer Monitor
50 Speed Acer CD-ROM
PCI 3D 4 Channel Sound
56K Internal Fax Modem
Amplified Stereo Speakers

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Pentium III 866 $1,415
Pentium III 933 $1,485
Pentium III 1GB $1,560
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Built in SVGA & Intel 10/100
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128Mb SD RAM PC133
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15" Acer Monitor
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3D Intergrated Sound Card
56K Internal Fax Modem
Amplified Stereo Speakers

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AMD Duron 850 $1,599
AMD K7 900 $1,685
AMD K7 1GB $1,785
AMD K7 1.2GB $1,890
ASUS A7V 133 Deluxe M/B
3.5" FDD Panasonic
128Mb SD RAM PC133
30GB IBM 7200rpm HDD
A-Open Deluxe Tower Case
15" Acer Monitor
32Mb Riva TNT II AGP
Ps II Keyboard $ Mouse
50 Speed CD-ROM Acer
Creative VB128 Sound Card
56K Internal Fax Modem
600W Subwoofer Speaker

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Pentium III 866 $1,595
Pentium III 933 $1,665
Pentium III 1GB $1,750
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32Mb RIVA TNT II AGP
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Intel P III 866 $1,845
Intel P III 933 $1,925
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32M Leadteck Geforce II MX200
MS internet KB & Intelimouse
15" Acer Monitor
50 Speed CD-ROM Acer
Creative VB128 Sound Card
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Dual PIII 933 x 2 $2,380
Dual PIII 1Gb x 2 $2,530

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Dual CPU PC133 & 4 DIMM
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TI Pro Server Pack

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Dual PIII 933 x 2 $3,450
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Armada E500 PIII 850 128M/20G DVD 15"TFT 56K 10/100 W 2k	$5,945
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CANON BJ-300/ 330	7	4-BKL
CANON BJC-600/610/620	16	5-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	45	19-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BC-20	9	18-BKL
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HP Desk Jet 600/660/690 Series	6	8B-BKL
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EPSON Stylus Colour /PRO/XL	12	2-BKL
EPSON Stylus 820/colour II/IIs	12	23-BKL
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	12	33A-BKL
EPSON Stylus Colour 440/460/480/640/660/700/740/760/900	12	33B-BKL
IBM/LEXMARK 4076/1000/1020/2000/2030/2050 Series	12	35A-BKL
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CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	3x30	17-CLR
CANON BJC-3000/6000/8000 Series	3x8	47-CLR
HP Colour Desk Jet 300/400/500 Series & Olivetti!	3x12	14A-CLR
HP Colour Desk Jet 600C/660C/690C Series	3x12	14B-CLR
HP Desk Jet 850C/855C/870C/1000C Series	3x3	30A-CLR
HP Desk Jet 710/720/890/900 Series	3x3	30B-CLR
EPSON Stylus Colour /PRO/XL	3x4	16-CLR
EPSON Stylus 820/colour II/IIs	3x12	24-CLR
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	3x12	34A-CLR
EPSON Stylus Colour 440/460/480/640/660/700/740/760/900	3x12	34B-CLR
IBM/LEXMARK 4076/1000/1020/2000/2030/2050 Series	3x6	36A-CLR
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Canon BJ-300, 330
Canon BJC-600, 610, 620
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		K25CLR	6
K7BK	60	K1CLR	30
K8BK	7	K2CLR	12
K4BK	9	K2CLR	12
		K23CLR	6
K9BK	7		
K10BK	16	K3CLR	8
K11BK	12	K4CLR	4
K12BK	9/60	K5CLR	30
K12BK	60	K5CLR	30
K12BK	9	K5CLR	30
K27BK	9	K5CLR	30
K28BK	12	K35CLR	6
		K36CLR	6
K19BK	2	K24CLR	6
		K15CLR	6
K32BK	12	K39CLR	6
K13BK	12	K20CLR	12
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K17BK	12	K8CLR	6
K17BK	12	K17CLR	12
K21BK	3	K34CLR	3
K26BK	12	K16CLR	12
K31BK	12	K40CLR	12
K6BK	12	K16CLR	12
K6BK	12	K35CLR	6
		K33CLR	9/12
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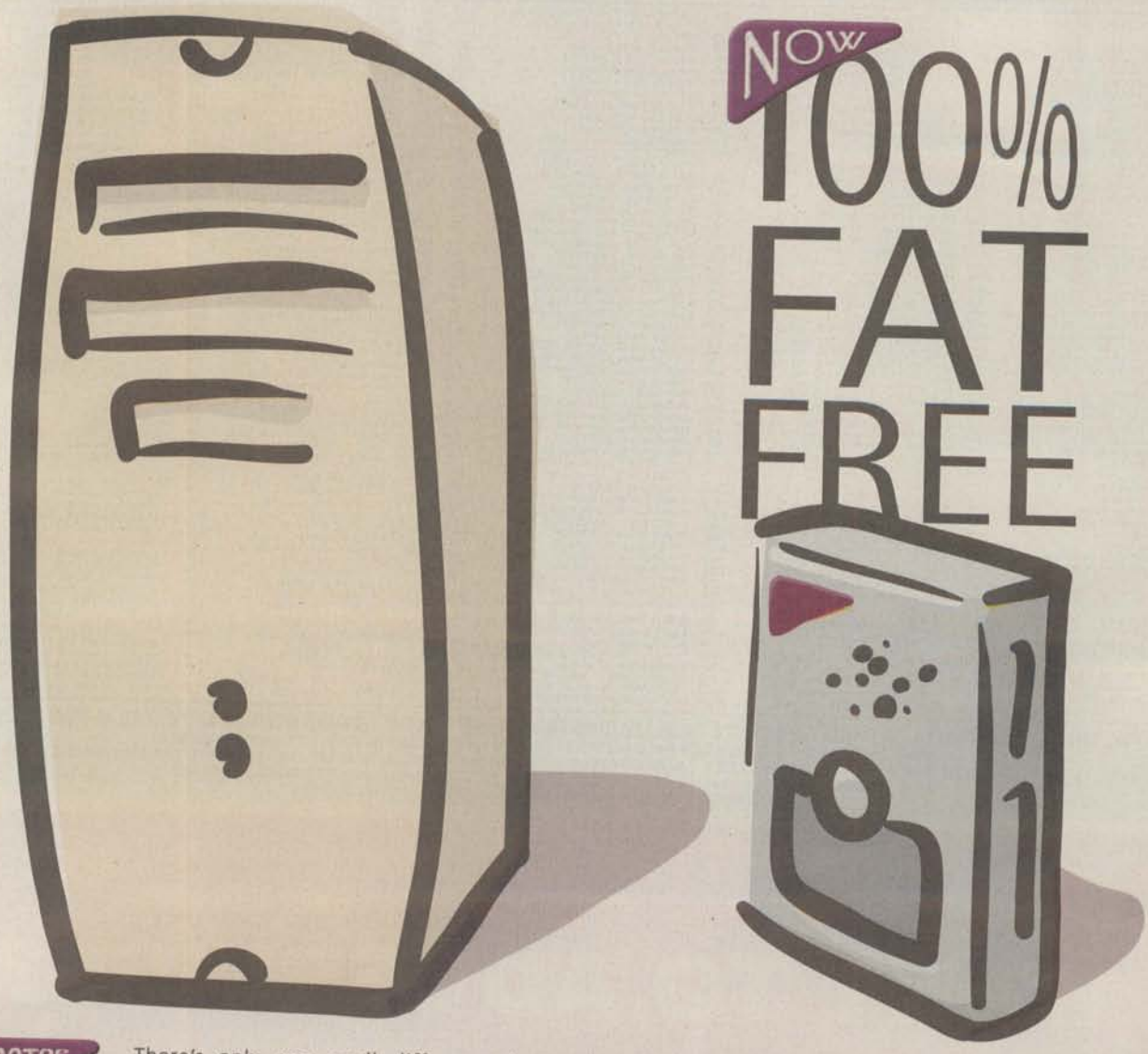
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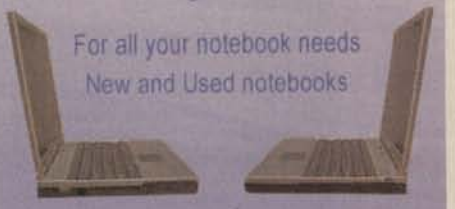
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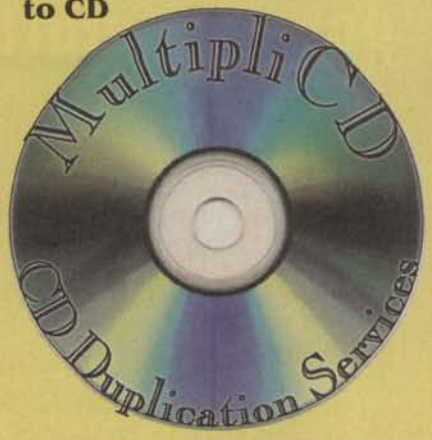
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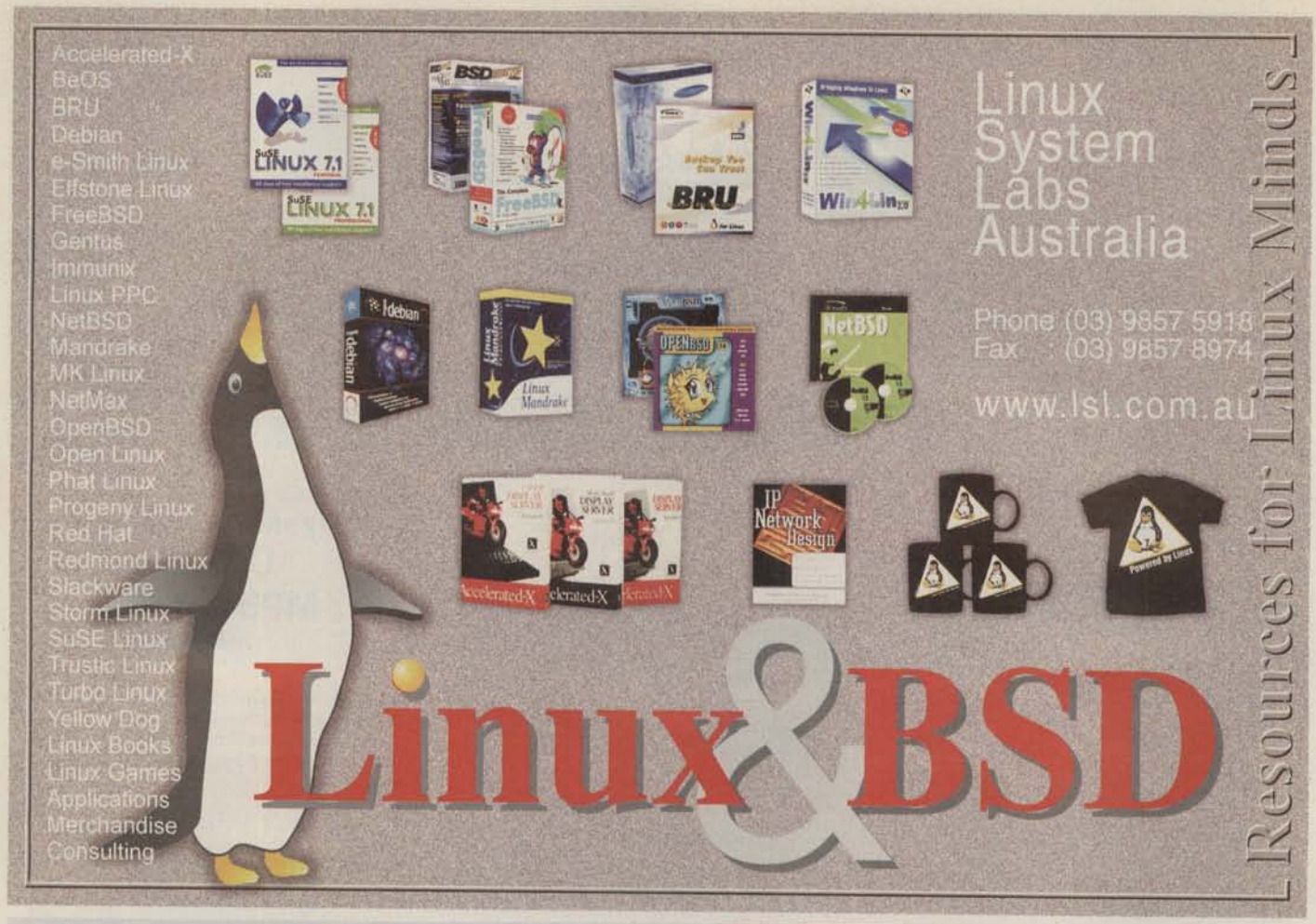
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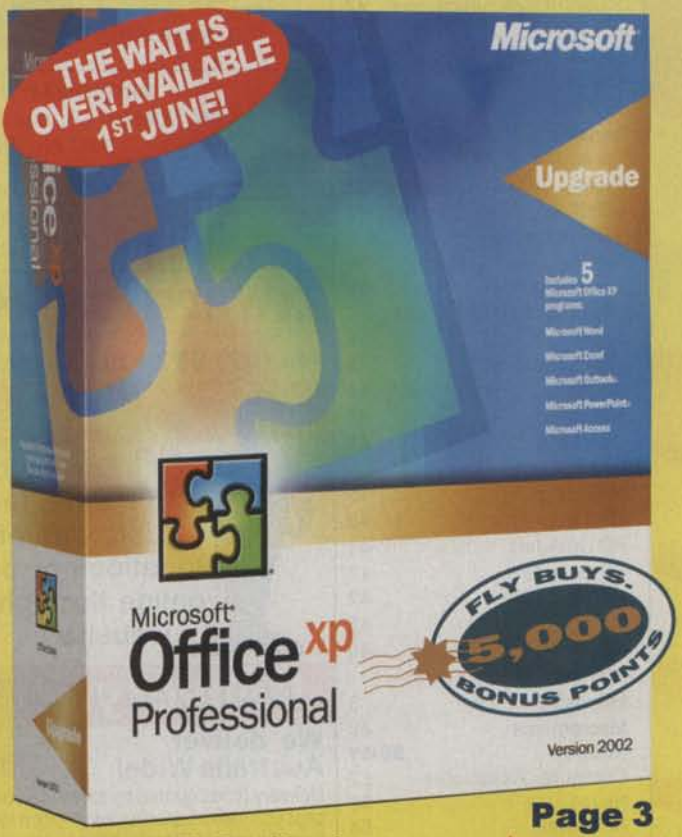
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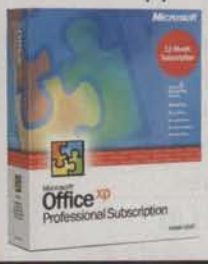
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Developer Tools			✓		
Publisher 2002				✓	
Intellimouse Explorer				✓	
Part Number	(C2082)	(C2084)	(C2772)	-	(C2837)
Full Version (GST INC)	**$980**	**$1,177**	**$1,567**	**N/A**	**$329**
Part Number	(C2083)	(C2085)	(C2773)	(C2081)	-
Upgrade (GST INC)	**$488**	**$649**	**$1,079**	**$894**	**N/A**



$60 Cash Rebate when you purchase Office XP Professional Subscription (C2837) between 01/06/01 - 30/08/01 by redemption

Individual applications also available as above! *Ask about Volume Discounts (Licensing)*



New to Office XP – Professional Subscription

Get the full functionality of MS Office in an affordable, annual subscription.

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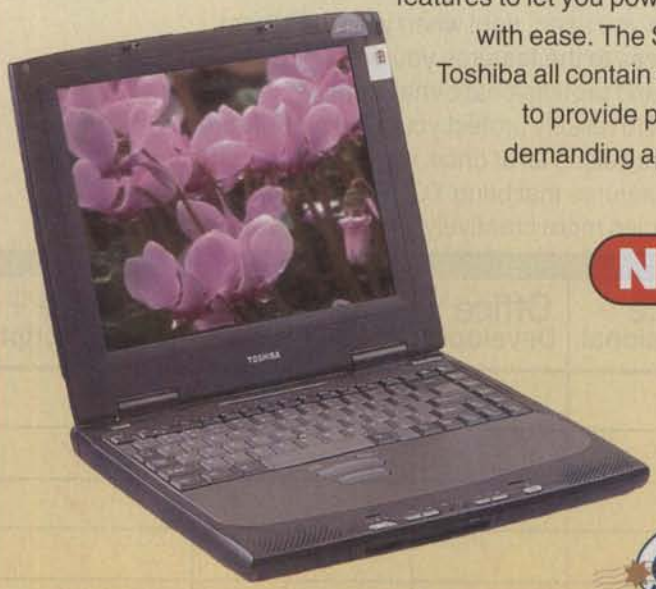
TOSHIBA

Web Direct www.ht.com.au/cat/toshiba

Affordable high performance

Satellite 1730XCDT

The Satellite Series gives you the best of both worlds - power and affordability. The ideal small business or home office mobile computer, every Satellite is built with just the right mix of features to let you power through the day-to-day computing tasks with ease. The Satellite range of notebook computers from Toshiba all contain colourful displays and powerful processors to provide plenty of CPU horsepower to even the most demanding applications, while the integrated multimedia devices never leave functionality behind.



NEW

* Intel Celeron 650MHz
* 64Mb / 320Mb SDRAM
* 10 Gb HDD
* Internal Modem 56K
* 13.3"TFT
* CD Drive
* Windows Me

FLY BUYS 5,000 BONUS POINTS

(B8623) GST INC

$2,715

Rent for $27.95

Satellite Pro 30CDT

The Satellite series is the ideal notebook for small and medium business, corporate projects and consumers providing the most CPU/Dollar from a major vendor without compromising features. This Satellite features a Celeron 500MHz CPU, 64MB Ram, 10GB Hard Disk, Windows® ME, 12.1" Active Matrix TFT Screen, 56KB Modem in an all new case.



Processor	Celeron 500MHz
RAM Std/Max	64/192 MB
Hard Disk	10GB
Screen	12.1" TFT
CD-ROM	24xCD-ROM
Mic & Spkr	Speakers
Port replicator	No
Select bay	No
DVD capable	No
Weight	2 kg
Warranty	1 Year
56K v.90 modem	Yes
RENT*	$31.81
GST INC	$3,089 (B2350)

FLY BUYS 5,000 BONUS POINTS

Ask about...

EXTENDED HARRIS TECHNOLOGY WARRANTY

- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site

FLY BUYS 5,000 BONUS POINTS

Collect 5000 Bonus Fly Buys points when you purchase B8623, B2350 or between 20/05/01 - 30/06/01

NO FURTHER DISCOUNTS AVAILABLE ON...

ALL TOSHIBA NOTEBOOKS AND ACCESSORIES SOLD FROM HARRIS TECHNOLOGY

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TOSHIBA

Web Direct www.ht.com.au/cat/toshiba

Compare Satellite Pro Models

Satellite Pro 4600 Series

The Satellite Pro 4600 puts the latest performance, multimedia, storage and display technologies within reach. With a number of configurations to choose from, the Satellite Pro Series lets you pick and choose which technologies are right for you.

* Pentium III SpeedStep 650MHz
* 64Mb / 512Mb SDRAM
*10GB EIDE HDD
*10/100 BaseTX Ethernet
*56K V.90 Data & fax modem
* Int 8X DVD-ROM
*14.1" TFT display
* Windows 98 Second Edition



(B6271) GST Inc **$4,398**

Rent for $41.10

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ALL TOSHIBA NOTEBOOKS AND ACCESSORIES SOLD FROM HARRIS TECHNOLOGY

Satellite Pro Range

	Satellite Pro 4330-650	Satellite Pro 4600-700	Satellite Pro 4600-800	Satellite Pro 4600-650
Processor	Celeron 650MHz	Pentium III 700MHz	Pentium III 800MHz	Pentium III 650MHz
RAM Std/Max	64/320 MB	128/512 MB	128/512 MB	64/512 MB
Hard Disk	10GB	20GB	20GB	10GB
Monitor	14.1" TFT	14.1" TFT	15" TFT	14.1" TFT
CD-ROM	24x	DVD	DVD	DVD
Mic & Spkr	Yes	Yes	Yes	Yes
Port replicator	Optional	Optional	Optional	Optional
Video Ram	8Mb	16Mb	16Mb	16Mb
DVD capable	No	Inc 8xDVD	Inc 8xDVD	Inc 8xDVD
Weight	3.17 kg	3.17 kg	3.17 kg	3.17 kg
Warranty	1 Year	1 Year	1 Year	1 Year
56K V.90 & 10/100 LAN	56K Modem Only	Yes/Wireless	Yes/Wireless	Yes/Wireless
RENT*	**$34.84** (B6192)	**$47.68** (B6297)	**$52.40** (B7977)	**$41.10** (B6271)
GST INC	**$3,384**	**$4,859**	**$5,749**	**$4,398**
RENT*	**$36.81** (B6230)	**$47.83** (B6311)	**$54.46** (B7978)	**$42.97** (B6287)
GST INC With Windows NT/2K	**$3,575**	**$4,998**	**$5,975**	**$4,598**

RENTSMART

SEE PAGE 64 FOR MORE DETAILS

The figures quoted are based on a per week basis over 3 years. To approved persons, Terms and Conditions apply.

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TOSHIBA

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Compare Tecra Models

Tecra 8200

NEW

Processor	Pentium III 850MHzSS*	Pentium III 1GHzSS*
RAM Std/Max	128 MB	256 MB
Hard Disk	20GB	20GB
Screen	14.1" TFT	14.1" TFT
CD-ROM	24x CD-ROM	CDRW
Mic & Spkr	Speakers	Speakers
Port replicator	Optional	Optional
Select bay	Yes	Yes
DVD capable	8 x DVD	8 x DVD
Weight	2.8 kg	2.8 kg
Warranty	3 Years	3 Years
56K V.90 modem	Yes	Yes
Ethernet 10/100 LAN	Yes	Yes/ Wireless
RENT*	**$66.80**	**$83.32**
GST INC With Windows 95/98	**$7,699** (B8636)	**$9,759** (B8638)
RENT*	**$67.93**	**$85.29**
GST INC With Windows 2000/NT4	**$7,829** (B8637)	**$9,989** (B8639)



- Pentium III 850MHz SS
- 14.1" TFT
- 128MB RAM
- 20GB HDD
- 8 x DVD
- 3 Year Warranty

(B8636) GST INC

$7,699

Rent for $66.80

NO FURTHER DISCOUNTS AVAILABLE ON...

ALL TOSHIBA NOTEBOOKS AND ACCESSORIES SOLD FROM HARRIS TECHNOLOGY™

TOSHIBA ACCESSORIES

TOSHIBA Battery Charger For for Tecra (90056) GST INC **$514**

TOSHIBA A4 Leather Bag (68408) GST INC **$229**

TOSHIBA USB 18-key Numeric Pad For Satelite Series (A3773) GST INC **$90**

TOSHIBA Universal AC Adapter For Tecra 8000/ Satellite 4000/4010 & others (44200) GST INC **$109**

Tecra 8100

Processor	Pentium III 750MHzSS*
RAM Std/Max	128 MB
Hard Disk	20GB
Screen	14.1" TFT
CD-ROM	24x CD-ROM
Mic & Spkr	Speakers
Port replicator	Optional
Select bay	Yes
DVD capable	6 x DVD
Weight	2.8 kg
Warranty	3 Years
56K V.90 modem	Yes
RENT*	**$56.90**
GST INC With Windows 95/98	**$6,539** (A2863)
RENT*	**$58.38**
GST INC With Windows 2000/NT4	**$6,729** (A2864)



Styled for consistant mobile performance, the Tecra 8100 series provides you with the ultimate combination of traditional Tecra investment benefits, high processor performance and a new sleek look and feel.

- Pentium III 750MHz SS
- 14.1" TFT
- 128MB RAM
- 20 GB HDD
- 6 x DVD
- 3 Year Warranty

(A2863) GST INC

$6,539

Rent for $55.51

JUN 6

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TOSHIBA

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Compare Portege Models

Portege 3490CT



NEW

The Portégé® 3490CT is the ultimate statement in mobile computing with its Pentium® III power, large high resolution colour display, long battery life and easy functionality all packed into an ultra thin lightweight body finished in sleek magnesium. With head turning style and work burning performance, the Portégé® 3490CT is the perfect tool for the travelling executive ready to succeed in the new world.

	Portégé 3490CT	Portégé 7220CTe
Processor	PIII 700MHz	PIII 650MHz
RAM Std/Max	128 MB	64/192 MB
Hard Disk	20 GB	12GB
Screen	11.3" TFT	13.3" TFT
Display	1024x768	1024x768
CD-ROM	Optional	Optional
Mic & Spkr	Yes	Yes
Port replicator	Yes	Optional
Select bay	No	No
LAN	Yes	Optional
DVD capable	Yes- optional	Yes
Weight	2 kg	2 kg
Warranty	3 Years	3 Years
56K V.90 modem	Yes	Yes
RENT*	$51.58	$48.80
GST INC With Windows NT/2K	$5,390 (B8695)	$5,099 (A7020)
RENT*	$49.38	
GST INC Windows 98 SE	$5,160 (B8629)	N/A

NO FURTHER DISCOUNTS AVAILABLE ON... ALL TOSHIBA NOTEBOOKS AND ACCESSORIES SOLD FROM HT

Blue Tooth Technology

Toshiba Brings First Bluetooth PC Card Solution to Market



Toshiba's wireless solution empowers *portable computer users to unplug* from the restraints of conventional wired computing with a fully integrated Bluetooth PC Card, complete with SPANworks productivity software. Using short-range wireless radio communication, Bluetooth technology facilitates fast and secure transmission of both voice and data at speeds of up to 1 Mbit/s, which is up to 20 times faster than a standard V.90 modem connection. Utilising this revolutionary wireless technology, Toshiba's Bluetooth PC Card can be used to connect portable computers, printers, digital mobile phones, PDAs, digital cameras, network access points and other mobile devices to one another and connect to the Internet or a LAN without the need for wires or cables.

(B6572) GST Inc **$258**

TOSHIBA ACCESSORIES

TOSHIBA Slimline Battery Packs
Portege 7140/ 7220Cte (92963) GST INC **$125**
For Portégé 3010/3020 (Lithium Ion) (73665) GST INC **$119**
For Satellite 4000 Series (72109) GST INC **$116**

TOSHIBA High Capacity Battery Packs
For Portégé 3010/3020 (72475) GST INC **$240**
For Portégé 7000/7020 (66479) GST INC **$285**

TOSHIBA Battery Charger
For Tecra 8000 (29357) GST INC **$190**

TOSHIBA Universal AC Adapter
For Tecra 8000/ Satellite 4000/ 4010 & others (44200) GST INC **$109**

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Fax: 1300 13 6666 Email: sales@ht.com.au
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COMPAQ

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Technology Partner COMPAQ
HARRIS TECHNOLOGY™ for all your computer needs!

ARMADA 110 NOTEBOOK

The NEW Armada 110 all-in-one notebook is designed for growing businesses and offers exceptional value-for-money, without sacrificing performance.

- Intel Celeron 700MHz Processor
- 12.1" Colour TFT SVGA Display
- 64MB SDRAM
- 10GB Hard Disk Drive
- 24X Max CD-ROM
- 3.5" 1.44MB Diskette Drive
- Integrated Mini PCI 56K Modem
- Microsoft Windows ME
- 1 Year Limited International Warranty, including pick-up in Australia*

(C0644) GST INC: **$2,495**

RentSmart $25.69 / week

HOT NEW PRODUCT



Product pictured is the 14.1" model.

*Includes pick-up from anywhere within Australia, with a 48-hour service workshop turnaround repair time.

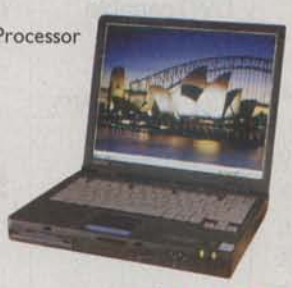


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ARMADA E500 NOTEBOOK

Value, expandability and performance, the Armada E500 notebook provides the all-in-one solution that will meet your individual needs.

- Mobile Intel Celeron 700MHz Processor
- 13.3" Colour TFT XGA display
- 64MB SDRAM
- 10GB Hard Disk Drive
- Removeable Diskette Drive
- 24X Max CD-ROM
- Integrated Modem and 10/100 Ethernet
- Microsoft Windows 98 SE

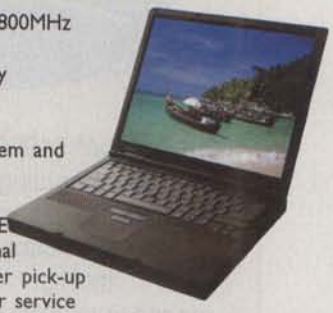


Rent Smart $36.43 /week

(B8682) GST INC: **$3,715**

ARMADA M700 NOTEBOOK

- Mobile Intel Pentium III 800MHz Processor
- 14.1" Colour TFT Display
- 128MB SDRAM
- 20GB Hard Disk Drive
- Integrated 56k/v.90 Modem and 10/100 NIC
- 8x DVD -ROM Drive
- Microsoft Windows 98 SE
- 3-year limited international warranty, including courier pick-up in Australia and a 48-hour service workshop turnaround repair time



(B3809) GST INC: **$6,498**

RentSmart $59.23 / week

RENTSMART

SEE PAGE 64 FOR MORE DETAILS

The figures quoted are based on a per week basis over 3 years. To approved persons. Terms and Conditions apply.

THE WORLD'S MOST POPULAR SERVERS ARE NOW AVAILABLE AT SMALL BUSINESS PRICES.

ProLiant ML 330e

The perfect first server for a business!

- Delivers easy-to-manage file, print & Internet sharing
- Intel Pentium III 800MHz processor with 133MHz front side bus
- 64MB ECC SD RAM (expandable to 2GB)
- 6 Available PCI Expansion Slots
- 20GB ATA/1000 Hard Drive
- Includes Network Controller, Video Card and Renown Insight Manager Software
- 3 Year Limited Compaq Warranty

(C0645) GST INC: **$1,845** RentSmart: $27.51/wk

ProLiant ML 350

Offers the latest Technology with room to grow!

- Ensures constant uptime for your business with hot-plug options
- Dual capable Intel Pentium III 933MHz & 133MHz front side bus
- 128 MB ECC SDRAM (Expandable to 2 GB)
- 9.1GB Wide-Ultra SCSI Hard Drive (Expandable up to 218GB)
- 6 Available PCI Expansion Slots
- Includes Network Controller, Video Card and Renown Insight Manager Software
- 3 Year On Site, Next Business Day Compaq Warranty

(A8055) GST INC: **$4,245** RentSmart: $39.67/wk

FOR YOUR CONVENIENCE, PRE-CONFIGURED BUNDLES AVAILABLE:

PIII 800/20GB/128MB/ TR-5 BackUp Drive/ Windows 2000 Server
(C2925) GST INC: **$4,495 RRP** (Save $796*)

PIII 800/20GB/256MB/ TR-5 BackUp Drive/ SBS 2000 Server
(C2926) GST INC: **$5,990 RRP** (Save $1,530*)



PIII 933/9.1GB/128MB/ TR-5 BackUp Drive/ Windows 2000 Server
(C2928) GST INC: **$5,995 RRP** (Save $1,525*)

PIII 933/9.1GB/256MB/ TR-5 BackUp Drive/ SBS 2000 Server
(C2930) GST INC: **$7,490 RRP** (Save $1,500*)



*Based on RRP.

The smart servers for business. Built-in pre-failure warranty on hard drives, processors, and memory mean the server detects any failing parts before your server goes down. Compaq will then immediately ship the parts required for your piece of mind.

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iPAQ Desktop, Pocket PC & Projectors

THE VERY LATEST COMPAQ iPAQ DESKTOP IS A FLEXIBLE AND INNOVATIVE BUSINESS TOOL.

New technology features are combined in its compact, sleek design;and it delivers new levels of product security. It is not only affordable to buy but also to run. Although sophisticated in its capabilities, the Compaq iPAQ has been created to deliver an unprecedented level of PC modularity.

- Intel Celeron 700MHz Processor
- 64MB 133MHz SDRAM
- Integrated Intel 3D Graphics
- 10GB Ultra ATA 100 Hard Drive
- Integrated AC97 audio
- Integrated Intel Network Card
- Compaq Carbon Scroll Mouse
- Compaq Carbon Easy Access Keyboard
- Microsoft Windows Me

(B8286) GST Inc:
from
$1,095
RentSmart $12.00 / week

OTHER CONFIGURATIONS ALSO AVAILABLE



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for all your computer needs!

WORK WHERE YOU CHOOSE TO WITH A COMPAQ iPAQ POCKET PC



COMPAQ iPAQ POCKET PC H3630 COLOUR UNIT
(A3737) GST Inc: **$1,099**
RentSmart: $12.00 / week

- Fastest PDA on the market – 206Mhz Intel StrongARM processor
- More memory - 32MB of storage for your files including MP3's, addresses,e-mails and attachments
- Most expandable – with the expansion jacket system you can add CompactFlash or PC card accessories and Wireless LAN, GPS Navigation Pack, Bluetooth Communication Packs and Cellular Technologies (GSM).
- Easy to view - only PDA with reflective technology for best screen resolution outdoors.
- Easy to use – natural handwriting recognition, record voice notes, familiar Windows interface.
- Productivity Software – Pocket Word, Pocket Excel, Pocket Internet Explorer
- Desktop Software – ActiveSync 3.1, Microsoft Outlook® *2000*, Internet Explorer 5.0

Also available:

Compaq
iPAQ H3660 - 64MB Colour Unit
(C2139) GST Inc:
$1,440

Compaq
iPAQ H3130 – 16MB Mono Unit
(B4505) GST Inc:
$774

COMPAQ iPAQ STOWAWAY PORTABLE



(C0247) GST Inc:
$249
RentSmart: $12.00 / week

Introducing the new Compaq iPAQ Stowaway Portable Keyboard, which will allow people to quickly and comfortably enter text into Compaq iPAQ pocket PCs, without having to carry around a full-size keyboard.

COMPAQ'S MICROPORTABLE PROJECTORS

COMPAQ MP1400

- 800 x 600 SVGA native display resolution and auto scales up to SXGA and Macintosh resolutions
- Increased light output of 700 ANSI lumens
- On-screen menu or adjusting tint, brightness, colour and many more image settings
- Operating noise less than 40 decibels
- Optional remote control/multimedia adapter with 8W Premier Sound speaker and video plug of VCR, DVD and camcorder inputs
- Only 1.9kgs
- 2 year warranty



RentSmart $53.26 / week
(A5430) GST Inc **$5,843**

COMPAQ MP2800 – NEW!

- 1024 x 768 XGA display resolution
- Increased light output of 1000 ANSI lumens
- On-screen menu or adjusting tint, brightness, colour, keystoning and many more image settings.
- Remote control/multimedia adapter with 8W
- Premier Sound speaker and video plug or VCR, DVD and camcorder inputs, USB port, DVI connector
- Operating noise levels less than 40 decibels
- Integrated zoom lens
- One of the world's smallest projectors weighing only 1.36kgs
- 2 year warranty



RentSmart $78.38 / week
(B8669) GST Inc **$9,180**

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HP Networks & Servers

NEXT BUSINESS DAY ADVANCE REPLACEMENT - LIFETIME WARRANTY

****PLEASE NOTE THAT PRICES ARE SUBJECT TO CHANGE ON ALL PRODUCTS****



HP ProCurve Switch 408

Unmanaged 8 port 10/100 switch in a compact sized package. This switch offers half/full duplex, 10/100 autosensing on every port. Warranty: Lifetime, Exchange Next Day (79125) GST INC: **$340**

HP ProCurve Switch 2512 & 2524



9.6GBPS BACKPLANE & AUTO-MDI/-X! • Lowest Price 10/100 Managed Switch • Provides a rich, layer 2 feature set • Includes 2 built-in gigabit transceiver slots • Auto MDI/-X on all 10/100 and 100/1000 ports • Lifetime warranty for as long as you own the product • Wire-speed performance on all ports • FREE HP TopTools Management Software included

2512 (12 port managed switch)
(A9703) GST Inc: **$1,715**

2524 (24 port managed switch)
(B0062) GST Inc: **$2,196**

HP ProCurve Switch 2312 & 2324

HOT NEW PRODUCT



Ideal for low-cost, unmanaged 10/100 connectivity • Lowest Price 10/100 Switch • Includes 2 Built-in Gigabit transceiver slots • Brings 10/100/1000 solutions to the market • Media-flexible ports for uplinks and server connections • HP quality, functionality and performance • Plug and play solution

2312 (12 port unmanaged switch)
(B0063) GST Inc: **$1030**

2324 (24 port unmanaged switch)
(B0064) GST Inc: **$1,470**

HP ProCurve Switch Modules

HOT NEW PRODUCT

HP ProCurve Switch Gigabit Stacking Kit
(78306) GST INC: **$422**

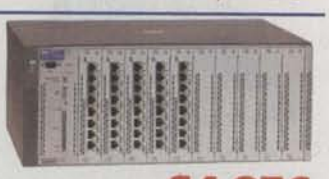
HP ProCurve Gigabit-SX Transceiver
(82140) GST INC: **$1,279**

HP ProCurve Gigabit-LX Transceiver
(82141) GST INC: **$2,033**

HP ProCurve100/1000-T Transceiver
(A9127) GST INC: **$889**

HP ProCurve 100-FX SC Transceiver
(A9128) GST INC: **$710**

HP ProCurve Switch 4000m



HP's 40 port managed 10/100/Gigabit switch provides a scalable low cost switching solution for organisations looking for scalable, expandable, low-cost migration to 10/100/Gigabit. • High speed/media-flexible uplinks including 10/100Base-T,Gigabit-SX, LX, and 1000Base-T. • Switch meshing = high availability with high performance • Stacking capability with single IP address management.

(66063) GST INC: **$4,876**

HP NETSERVER E-200



The Server with the best price/performance value for small businesses.

Starts your small business off on the right Track. The HP NetServer E200 offers the best value-to-performance ratio of any major server supplier.

A desktop PC may do the job when you are starting out, but as your small business expands, it quickly out grows the ability to cut corners on something as fundamental as a server. And with the HP NetServer E200 HP leads the top tier server suppliers offering full server grade technology, functionality and performance for the price of a PC.

- Intel PIII866 MHz processor with 133MHz front size bus
- 64MB registered ECC RAM standard (expandable to 768)
- 9.1GB, 7200rpm, 68-pin Ultra Wide SCSI HDD
- Four PCI, one ISA
- Integrated HP NetServer 10/100TX LAN adapter

(C1446) GST INC: **$2,795**

Rent 3 yrs - $28.78 per week* Call for long term *rental pricing



HARRIS TECHNOLOGY. for all your computer needs!

All systems include: 7 mass storage shelves (4 available after floppy, CD-ROM & 9GB disc), 5 expansion slots (4 PCI, 1 ISA combination), integrated 10/100 network interface, and easy set up CD.

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Fast delivery Australia wide

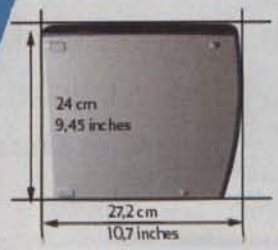
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HP Desktops

HP e-pc

HOT NEW PRODUCT





Storage
Removable, generously proportioned hard disk drive for all user needs.



Connectivity
Lockable USB, serial, parallel, PS/2 and LAN ports to fit your computing environment.

Ultra-small, ultra-smart
The revolutionary e-Vectra measures only 9.5 inches (24 cm) high.







Media Choice
Fast,slim CD and media-free models.

Power
Powerful Intel Pentium III and Celeron processor configurations and generous RAM to suit any business application.

e-Diagnostics
The intelligent eDiagTools technology allows instant problem identification and web-enabled notification to HP or your support staff.



Operating Systems
Choose from a range of Microsoft operating systems including Windows 2000 to match your corporate standard.

Microsoft

e-DiagTools

Processor:	hp e-pc C700	hp e-pc C700	hp e-pc PIII 866	hp e-pc PIII 866
SDRAM	64MB	128MB	128MB	128MB
Hard Disk	20G	20G	20G	20G
FDD	optional	optional	optional	optional
Monitor	no	no	no	no
CD - ROM	no	24x	24x	24x
OS	Windows '98	Windows '98	Windows 2000	Windows '98
Modem	Yes	Yes	Yes	Yes
Software	Word 2000	Word 2000	Word 2000	Word 2000
Part No.:	(B8730)	(B8731)	(B8732)	(B8733)
GST INC:	**$1,458**	**$1,645**	**$2,180**	**$1,998**
Rental:	$15.98	$18.03	$23.89	$21.90

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Celestion B933 System

COMPUCON

- Intel Pentium III 933Mhz Coppermine Cpu with 256K Cache
- Socket FC-PGA mATX Motherboard, ULTRA ATA 100 VIA 694X, 133Mhz FSB
- 128MB PC133 SDRAM
- 20.4GB Ultra ATA 100 7200Rpm Hard Drive
- 32MB Riva TNT2 M64 AGP Graphics Card
- Compucon Celestion Blue mATX Tower Case
- 1.44MB Floppy Drive
- 12xDVD/40x CD Speed IDE DVD-Rom drive
- Compucon Multifunction Internet PS/2 Keyboard
- Compucon PS2 Scroll Mouse
- Integrated Sound Blaster/ Direct Sound AC97 Audio
- 2 x Serial, Parallel, PS/2 keyboard and mouse, 2 x USB Ports
- 56K Internal Voice PCI v.90 Modem



Includes:
- MS Works Suite 2001
- Windows ME

Rent 3 Yrs **$15.55** (C2809) GST Inc

$2,287

Monitor Not Included in Price

15.1" LCD Flat Screen Monitor



(A8436) GST Inc **$1,549**

Odyssey Ministation C733MHz

COMPUCON

- Intel Celeron 733Mhz Cpu with 128K Cache
- Intel 815 Chipset Motherboard, 133Mhz FSB
- 64MB PC133 SDRAM
- 10GB Ultra ATA 100 Hard Drive
- GMCH Video with 4Mb SDRAM display cache
- Compucon Slim-line Odyssey Case with 90W PS (Dimensions of 78mm x 300mm x 320mm)
- 1.44MB Floppy Drive
- Compucon Windows 95 PS/2 Keyboard
- Compucon PS/2 Scroll Mouse
- Intel 10/100 Network Card + Wake-On-Lan
- 2x IEEE1394 High Speed Ports, TV Out, S-Video, Infra Red Support
- 1 x Serial, Parallel, PS/2 keyboard and mouse, 2 x USB Ports
- Integrated in ICH Software audio
- Windows Millenium Edition OEM Cd
- 3 Years On-Site Warranty



System also includes:
- 1 x Serial, Parallel, PS/2 keyboard and mouse, 2 x USB Ports
- Integrated in ICH Software audio
- Windows Millenium Edition OEM CD
- 3 Years On-Site Warranty

Rent 3 Yrs **$17.41** (C2808) GST Inc

$1,589

Monitor Not Included in Price

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EXTENDED HARRIS TECHNOLOGY WARRANTY

- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site

Atlantis Gaming Machine

COMPUCON

- AMD AthlonThunderbird Socket A 1.1Ghz 200Mhz FSB CPU
- MSI-6340 FC-PGA VIA Chipset mATX MotherBoard 133Mhz FSB
- 256MB PC133 SDRAM 168Pin
- 20.4GB IDE Ultra ATA 100, 7200Rpm Hdd
- Leadtek GeForce-2 MX 256 32Mb Video Card 2X/4X AGP
- Compucon Atlantis iGrey ATX Case
- 1.44MB Floppy Drive
- 32/8X/4X IDE CD-RW drive with Software
- Compucon PS2 Multifunction Internet Keyboard
- Compucon PS/2 Scroll Button Mouse
- Creative SoundBlaster Live Value Sound Card
- Netcomm 56K Fax/Modem Internal



Games Software includes:

Age Of Empires II (The Age o fKings), Midtown Madness 2, Microsoft Golf 2001 Edition

Plus:

Microsoft Windows Millenium Edition CD



Rent 3 Yrs **$27.35** (C0223) GST Inc

Monitor Not Included in Price

$2,789

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Centaur Pentium 4

COMPUCON

- Intel Penium 4 - 1.4Ghz CPU
- Intel D850GB Motherboard, i850 chipset
- 128MB RDRAM (Rambus)
- 30GB Hard Drive, 7200RPM
- Compucon Centaur Tower Case
- 1.44 MB Floppy Drive
- Compucon Internet Keyboard
- Compucon Scroll Mouse
- SoundBlaster 128 Sound Card
- Intel 10/100 Network Card
- Windows ME on CD, Microsoft Encarta
- Microsoft Games Pack



Power of the Pentium 4!

intel inside pentium 4

Rent 3 Yrs **$43.73** (B2473)

GST Inc: **$4,679**

Monitor Not Included in Price

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The Silcon Graphics Zx10 visual workstation is a deskside workstation featuring Wahoo Technology, which delivers unparelleled system throughput and I/O bandwidth in an industry-standard architecture.

Built to specification the Zx10 Graphic Workstations start from a 933MHz PIII processor, 256MB PC133 SDRAM, 18.2GB 10k U160m SCSI, G450 Gfx 32MB.



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- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site



sgi 1450 Server

Intel Pentium III Processor Memory Capacity 4GB SDRAM, ECC protected Pre Installed 1.44Mb FDD 32x CD-ROM Drive. Integrated 10/100TX LAN (Price excludes rack)

(C0626) GST Inc: **$9,980**



sgi 1200 Server

Space saving rack mount 2 IU chassis, Scales to two Intel Pentium III processors and 2GB of SDRAM, Designed for remote manageability, ECC protected, Pre Installed 1.44Mb FDD and 32x CD ROM Drive.

(96824) GST Inc: **$4,655**



sgi 1100 Server

Designed for remote manage-ability this space-saving rack mount chassis offers minimum footprint with maxamin performance. Scales to Intel Pentium III processors and 2GB of SDRAM has cluster capability.

(C0497) GST Inc: **$4,140**

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CASSIOPEIA EM500

Mobile Multimedia



SPECIFICATIONS:
• Colour Display (TFT 65,536 colour, 240 X 320 LCD Screen) • VR4122 150Mhz CPU Speed • 16MB RAM with MMC Slot – SD compatible • Operating System Windows CE V3.0® • SMS, E-mail & Pocket Internet Explorer • Optional Headphone with Remote Control • Optional WAP browser with IrDA connectivity • Optional soft cable modem. **BUNDLED SOFTWARE:** MP3 and MS Audio Player (MS Standard), MS Word / Excel / Pocket IE, MS Money / MS E-Book Reader, Casio Movie Player / Picture Viewer, Outlook 2000 (Mobile Calendar / Address). **POWER & WEIGHT:** Li-ion Rechargeable battery (approx. 5 hours of operations), Weighs 215grams. **SIZE:** 128 x 81.8 x 19.25 mm. **I/O INTERFACES:** USB (Client) / USB Cable Bundle RS232, Microphone / Speaker / IrDA v1.2, DC jack / Stereo Headphone Jack / Cradle. **PACKAGE CONTENTS** Cassiopeia Unit, Stylus, USB connection cable, Li-ion battery & back-up battery, power adaptor, sync software and instruction manuals. (Specifications & package are subject to change)*

(A3919) GST Inc: **$1,199**

CASSIOPEIA E125



SPECIFICATIONS:
• Colour Display (TFT 65,536 colour LCD Screen) • 150Mhz CPU Speed • 32MB RAM with CF Card Slot • Operating System Windows CE V3.0® • USB interface through docking cradle • Easy set of E-mail through wizard. **BUNDLED SOFTWARE:** MS Word & Excel, Pocket Money, Pocket IE, Multimedia Application (Audio & Video), Bundling Outlook 2000 & IE 5.0 **POWER:** Li-ion Rechargeable battery (approx. 6 hours of operations) **SIZE:** 131.2 x 83.6 x 20 mm. **I/O INTERFACES:** CF Card (Type II), RS232C / Microphone / Speaker / IrDA, DC jack / Stereo Headphone Jack / Cradle. **PACKAGE CONTENTS:** Cassiopeia Unit, Stylus, Cradle with USB connection attached, Li-ion battery & back-up battery, power adaptor, sync software and instruction manuals. (Specifications subject to change)*

(A4107) GST Inc: **$1,375**

CASIO® KP-C50 NEW



KP-C50 PC TAG WRITER

Print quickly with the touch of a finger during PC operation. Make a quick note of an email address, homepage, URL and more. Output data from schedule software and paste in conveniently in your pocket diary. Enhanced convenience with the mouse pad incorporated into the body.

- Works with PC applications - just select a line on the display for immediate printout
- Supports USB
- Comes with Software & USB Cable. Use same software requirements as KLP1000

(B8404) GST Inc: **$155**

CASIO® KD-C10 NEW

KP-C10 PC TAG WRITER



Easy printing without sacrificing space! The cute and colorful smart printer with USB. Make a quick note of an e-mail address, homepage URL, etc. Output data from schedule software and paste in conveniently in your pocket diary.

Compact, space saving design, Works with PC applications - just select a line on the display for immediate printout, Comes with Software and USB Cable.

(B8405) GST Inc: **$128**

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Ask about...
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- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site

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HP DesignJets

HP DesignJet 500

Professional graphics printer for 24" wide photo quality ads and graphics.



RES:	1200x600dpi
SPEED:	D size line drawings (sec): fast 90/normal 195/ best 360 Colour images (sq m/hr): 7.9 fast/ 3.3 normal/ 2.0 best
MEDIA:	Coated & glossy paper,technical media. Sheet & roll feed,auto cutter SIZES: Sheet: 211mm- 610mm (w) x 211-1897 (l); Roll: 24" (w) x 45.7m (l)
I/FACE:	Parallel, USB
SIZE:	1.2 x 0.49 x 0.36m; 38.6kg

HP DesignJet 500 24"	(A7234)	$4,130
HP DesignJet 500PS 24"	(A7233)	$5,615
HP DesignJet 500 42"	(B1178)	$6,670
HP DesignJet 500PS 42"	(B8498)	$7,730

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HP DesignJet 800

Professional graphics printer for 24" wide photo quality ads and graphics.



RES:	2400x1200dpi
SPEED:	Prints times as short as 60 seconds (D size prints)
MEDIA:	Coated & glossy paper,technical media. Sheet & roll feed, auto cutter SIZES: Sheet: 610mm- 1897mm ; Roll: 24" (w) x 45.7m (l)
I/FACE:	Parallel, USB
SIZE:	Printer in 2 sizes 42 or 24 Inches wide

HP DesignJet 800 24"	(B8514)	$10,060
HP DesignJet 800PS 24"	(B8518)	$14,500
HP DesignJet 800 42"	(B8513)	$11,860
HP DesignJet 800PS 42"	(B8519)	$16,730

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HP DesignJet 5000

Professional graphics printer photo quality unmatched by any other printer

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RES:	1200x600dpi on glossy media (6 colours:CMYKcm)
SPEED:	max: 46.4 sq m/hr, at max quality 8.27 sq m/hr, at productivity 6.32 sq m/hr
MEDIA:	Coated & glossy paper, backlit, opaque, vinyl, canvas... SIZES: Sheet: 211mm- 914mm (w) x 559- 1600mm (l); Roll: 24/36/42" (w), up to 91.4m (l)
I/FACE:	Parallel, HP JetDirect 610N 10/100 Base TX Print Server
SIZE:	2.0 x 0.69 x 1.3m: 100kg

HP DesignJet 5000 42"	(B6514)	$19,590
HP DesignJet 5000PS 42"	(B9792)	$25,730
HP DesignJet 5000 60"	(B6515)	$31,235
HP DesignJet 5000PS 60"	(B9791)	$38,545

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16" viewable image, 1280 x 1024 @ 75 Hz, Max Refresh Rate: 85Hz @ 1024 x 768 8, Complete On-screen Menus, Anti Reflective Screen Coating, Windows® 95/98, Windows® NT.



(B1831) GST INC

$720

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NEW

CPDG420 (19")

18" viewable image, 1880 x 1440 @ 70 Hz Max Refresh Rate: 85Hz @ 1600 x 1200, Complete On-screen Menus, Anti Reflective Screen Coating, Windows® 95/98, Windows® NT.



(B7964) GST INC

$1,260

FLY BUYS 1,000 BONUS POINTS

NEW

CPDG520 (21")

19.8" viewable image, 2048 x 1536 @ 75 Hz Max Refresh Rate: 85Hz @ 1800 x 1350, Complete On-screen Menus, Anti Reflective Screen Coating, Windows® 95/98 and Windows® NT.



(B7966) GST INC

$2,105

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FLY BUYS 1,000 BONUS POINTS

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SDMN50 (15")

15" XGA TFT Active Matrix LCD Panel, Black Matte Finish, Bright Picture, Sharp Images - 300:1 Contrast Ratio 200 cd/m2 Luminance / 0.297mm Dot Pitch, 1024 x 768 @ 75Hz, Wide Viewing Angle 140°, Stereo Speakers in Base, On-screen Digital Controls, Windows® 95/98 and Windows® NT.



(97422) GST INC

$2,549

SDMM51 (15.1")

15.1" XGA TFT Active Matrix LCD Panel. Sleek, Lightweight and Flexible Design with Zero Footprint New Improved Picture Quality, Fine .30mm Pixel pitch, Built-in stereo spkrs and head-Phone jack, Lt Grey/Dk Grey, Arm Mountable And Anti-theft lockable



(B0916) GST INC

$2,125

NEW

SDMM81 (18.1")

18.1" XGA TFT Active Matrix LCD Panel. Sleek, lightweight and flexible Design with Zero Footprint, new improved picture quality, fine .30mm pixel pitch, Built-in stereo speakers and headphone jack, Lt Grey/Dk Grey, Arm mountable and Anti-theft lockable.



(B8689)

GST INC

$4,389

CAMERAS

Cyber-shot DSC-P30

NEW

Memory Stick Digital Camera 1.3 Megapixel

Memory Stick, InfoLithium compatible (NPFS11) 3 x Zoom (6x Precision Digital), Optical Veiwfinder, 1.5" LCD, Email, TIFF, MPEG EX, Clipmotion, AF Illuminator, Video out, USB. 1280x960 (1.3 Megapixel) resolution, MGI Photosuite (Windows/Mac) VideoWave (Windows) 1yr warranty



(C2363)

GST INC **$859**

Cyber-shot DSC-F505V

Memory Stick Digital Camera 3.3 Megapixel

InfoLithium S (NPFS11), 5x Zoom (10x Precision Digital), 2" LCD, MPEG Movie HQ,Voice, Memo, Email, Audio/Video out, USB, External flash socket, 2240x1680 (3.3 Megapixel) Resolution, MGI PhotoSuite (Windows/Mac), MGI VideoWave (Windows), 1yr warranty



(A7100) GST INC **$1,840**

Cyber-shot DSC-P1

NEW

Memory Stick Digital Camera 3.3 Megapixel

3.3 Megapixel resolution
3x Optical zoom (6x Precision Digital zoom)
Memory Stick Digital Still Camera
MPEG Movie function



(B1237) GST INC

$1,758

Mavica FD75

NEW

Floppy Disk Digital Still Camera .35 Megapixel

3.5" 2HD Floppy, InfoLithium L (NPF330/NPF550), zoom, 2.5" LCD, 640 x 480 (0.35 Magapixel) Silver in colour.



(B8349) GST INC **$899**

Mavica CD1000

Mini CD-R Digital Still Camera 2.1 Megapixel



8cm 156MB CD-R, InfoLithium L (NPF330/NPF550), 10x zoom (20x Precision Digital), Electronic Viewfinder, 2.5" LCD, MPEG Movie HP, Voice Memo, Email, Audio/Video Out, USB, External Flash Socket, 1600x1200 (2.1 Megapixel) Resolution, Picture Gear 4.1 Lite, MGI PhotoSuite, MGI VideoWave, Adaptec DirectCD.

(A7097) GST INC **$2,635**

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- Memory Stick Slot
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- 12.1" XGA (1024x768) display
- 2 USB Ports & I-link port



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GST INC

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Memory Stick Mouse
USB mouse with built-in memory stick reader/ writer, Optical sensor, Left/ Right and scroll button

Shown with optional SlimDock™ docking station
*Not actual size

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Surge Arrest 5 Strip (A0098) GST INC **$65**

An APC SurgeArrest is your guarantee that your hardware and valuable electronics are protected regardless of lightning strikes and everyday unexpected power surges. SurgeArrest also offers the best protection from line noise which can cause glitches and errors in electronic operations and computer data.



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The SurgeArrest Notebook Pro Surge Protector provides the mobile notebook professional with advanced AC and telephone line protection. The unique, in-line design creates a compact, lightweight surge protector that is truly portable and appropriate for use in any country throughout the world. With built-in Excess Current Detection, the Notebook Pro warns you against potential modem damage. A Velcro mounting strap and 6 ft. telephone cord eliminate the need to carry any additional accessories.



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500va (56230) GST INC **$215**

650va (56231) GST INC **$280**



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Smart battery backup & high performance surge suppression for Windows 95 & NT PCs

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APC Back-UPS Pro **420si** (76637) GST INC **$360**

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Network power protection to increase availability of your system. APC Smart-UPS 2U Rackmount features include longer runtime to keep your system safe and a 2U design to save your valuable rack space by 30%. Hot swapping batteries is also now faster and easier with the replacement battery chassis tray.



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New Version v3.0 Delivering Even Greater Control, Security and Functionality

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- Auto-sensing 10Base-T/100Base-TX
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- Pentium-class processor
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- RAID 5, 1 or 0
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- v3.0 Full functioning FTP server
- v3.0 SNMP support

Compatibility
- Simultaneous support for Windows 2000, NT, Netware, UNIX, Linux and Macintosh networks, and clients across TCP/IP, IPX, NetBEUI and AppleTalk networks
- v3.0 Complete NFS 3.0 protocol support, symbolic linking of files and directories, Network Lock manager and rpcinfo command support.

Network Backup
- v3.0 Compatible with Windows and Netware backup software, including Veritas Backup Exec, Computer Associates ARCserveIT and Microsoft backup software for Windows 95/98/NT/2000
- v3.0 SMART predictive disk failure analysis

Network Security
- v3.0 Set access permissions at file and directory level
- Integrates with Microsoft Domain Controllers or local user list

Guarantee
- 3-year parts and labour

Price
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- 40GB (C0035) GST Inc. **$2,098**
- 80GB (C0036) GST Inc. **$3,359**
- 160GB (C0037) GST Inc. **$7,395**
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MaxAttach 4100: Win NT/Unix/Netware/Mac

now includes SCSI backup built in

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- Dual 400 Mb/sec Firewire Interface
- Mac and PC Compatible
- Plug and Play
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Quantum DLT & SDLT Tape Drives

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Quantum DLT8000/ST
(82502) GST INC **$7,240**

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(71231) GST INC **$155**

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- 400 Gb native, 800 Gb compressed capacity
- DLT1 Single Tape Drive included
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- LVD 68 pin SCSI Interface
- Includes 1 data tape and cable
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- Optional On-site warranty.

(A0476) GST INC **$9,800**

ECRIX VXA-1 Tape Drive

INTERNAL
(C1847) GST INC **$2,170**

EXTERNAL
(C1915) GST INC **$2,615**

EXTERNAL BUNDLE PACK
Firewire interface and Retrospect software
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- Variable speed operation matches data throughput to your computer
- Packet based technology guarantees reliable restores
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- Variety of case colours (*White, black, red, translucent)
- Compatible with most backup software

Quantum DLT1 Tape Drive



INTERNAL
(88037) GST INC **$3,650**

EXTERNAL
(88038) GST INC **$4,055**

- 40GB native, 80GB compressed
- 3-6MB sec sustained, that's 21.6GB/Hour
- Ultra Wide SCSI LVD interface
- Reads DLT4000 tapes (20/40Gb Only)
- Internal or External models
- LINUX Approved
- Compatible with most common backup software
- Standard DLT form factor

Ask about...

EXTENDED HARRIS TECHNOLOGY WARRANTY

- ☐ Extend to a total of 3 Years Return to Base
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- ☐ Upgrade Return to Base of Warranty Extension to On-Site

Fly Buys.

Collect **Fly Buys** points on your computer hardware & software when you purchase from HARRIS TECHNOLOGY.

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OPTISTOR®

Web Direct www.ht.com.au/cat/scsi

CD-R/W, Camera's & Caching Towers

PlexWriter 16/10/40A

ATAPI CD - Recorder/Rewriter/Reader with BURN-Proof Technology. Recently voted First Class in BEST Great stuff – tested and approved in top-secret labs of Wired Magazine September 2000. While your friends spend up to half an hour per disc burning audio CDs at 2x or 4x, Plextor's CD-RW drive blasts them out in 6 minutes. The PlexWriter 16/10/40A's name means that it records CD-R discs as 16X speed, rewrites CD-RWs at 10X, and reads back all CDs at 40 speed. Top-notch manuals and software make installation easy. The drive's accuracy is perfect – no misses or skips. Plextor are the leaders in CD-RW. BURN Proof (Buffer Under RuN – Proof) enables you to stop writing before buffer under run errors occur and then to continue writing by tying last point of recording and the next start point... no more drink coasters. Our customers are telling us that these drives are the best of the best and they are coming back for more. Comes with software, cables, manuals, ready for installation.



PLEXTOR®

(B7360) GST INC **$685**

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Monitoring & Surveillance Camera AXIS 2120

Keep your premises safe and stop theft with the Axis 2120 security camera.





Now you have the power to view and record images in full motion video over your LAN/WAN. If an alarm occurs, video streams can be directed to a local or remote disk drive over a network with simultaneous e-mail/ sms alerts sent to an administrator or emergency team. A web browser is all you need to start viewing the images. Easy to install, use and maintain. Featuring:

- In-Built video motion detection.
- Records images when movement is detected.
- For indoor and outdoor surveillance (with optional camera housing).
- Plugs directly into your network (modem port also available).
- Plug and watch over the Internet and any TCP/IP network.

(A3916) GST INC **$2,750**

AXIS® COMMUNICATIONS



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See Web Direct Link (at top of page) for more products and latest info!

CD/DVD Server CACHING TOWER



The new Optistor CD/DVD Caching tower is yet another addition to the Optistor NAS (Network Attached Solutions) range. Towers start from 25 CD or 4 DVD Capacity through to 255 CD's or 95 DVD's. Featuring:

- The Axis CDE100 CD-ROM Server,
- Hard disk caching support for up to 255 CD's or 95 DVDs.
- Great news for organisations requiring fast access to information stored on CDs and DVDs!
- Includes DVD-ROM drive to load CD and DVD data

(B6595) GST INC FROM **$3,675**

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JUN 21

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NETGEAR™

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Everybody's connecting

enquire for pricing on **netgear 10** and **10/100 Mbps** hubs.



network starter kits

SB 105
5 Port 10Mbps hub, 2x10/100PCI cards,cables, modem sharing software and guide

(A3293) GST INC
$139

FB 105
5 Port 10/100 switch, 2x10/100 PCI Cards, cables, modem sharing software and guide

(A3935) GST INC
$229



Wireless



The NETGEAR 802.11b wireless family allows small businesses to benefit from the productivity gains of an "Always-on, Always-connected" mobile workforce. The products are based on industry-standard 802.11b, so the customer is ensured interoperability as well as security, with WEP encryption. And since it's NETGEAR the products are backed with a 5 year Limited Warrantly and Free 24x7 support.

MA301 PCI Adapter Cradle
(B9927) GST INC **$117**

MA401 PCMCIA Adapter
(B9928) GST INC **$355**

ME102 Wireless Access Point
(B9929) GST INC **$737**

gigabit fibre + copper



These high performance Gigabit switches provides either fibre or copper backbone connectivity for power workgroups, data centres and server farms. No additional modules are required - each product ready to install straight from box.

RED HOT $

GA 622T 32/64 bit PCI gigabit network card
(B9943) GST INC **$479**

FS 510T 2 port 100/1000 with 8 10/100 ports (copper)
(A1209) GST INC **$1,879**

GS 504T 4 port 100/1000 (Copper)
(A1375) GST INC **$2,359**

FS 518T 2 port 100/1000 with 16 ports 10/100
(A1374) GST INC **$2,225**

GS 508T 8 port 100/1000 port
(B9916) GST INC **$2,889**

NEW
FS 517TS 16 port 10/100 stackable switch
(C2299) GST INC **$call**

printer servers

The Netgear print servers enables you to connect your printer to a network for sharing amongst multiple PC's



PS 105 10 Mbps Print Server
(67225) GST INC **$238**

PS 110 10/100 Mbps Print Server
(67226) GST INC **$269**

PS 113 10/100 Mbps Print Server 3 Port
(A3287) GST INC **$424**



enquire for pricing on **NETGEAR**
10 & 10/100Mbps hubs

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NETGEAR™

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Get Connected Now!

new product MR314

(C2297) GST INC
$Call

Features
- Broadband internet sharing without the hassle of cabling
- 802.11b compliant
- web based interface for easy installation
- 4 port switch ports to integrate into existing ethernet infrastructure



The **NETGEAR MR314** Wireless NAT router by **Netgear** complements the existing 802.11b wireless product family. It functions as an access point allowing all users cable or DSL internet access. The MR314 has static content filtering and 4 10/100 ethernet ports for seamless integration with your existing network.

Easy to set up and maintain with a simple web-based interface installation.



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shared internet access

The NETGEAR routers offer the ability to connect to the internet easily using ISDN, analogue or Cable/DSL. All products support IP routing and offer NAT and DHCP for security and ease of set-up.

FR314 4 Port 10/100 mbps cable/dsl firewall router NEW
(B6554) GST INC **$684**

RT 338 1 Port 10/100 mbps ISDN router
(97718) GST INC **$698**

RT 314 4 Port 10/100 mbps switch with cable/DSL interface
(A8862) GST INC **$420**

RM356 1 Port 10baseT hub with intergrated 56k modem
(70197) GST INC **$535**

RT 311 1 Port 10/100 mbps switch with cable/DSL interface
(97719) GST INC **$325**

FV318 VPN & Firewall Router w/ 8-port 10/100 switch for Cable DSL internet sharing NEW
(C2298) GST INC **$Call**

network cards

FA 311 Ethernet adapter 10/100 PCI
(A1372) GST INC **$44**



FA 312 Ethernet Adapter
(A1373) GST INC **$53**

FA 411 10/100 Mbps PC Card (With out dongle) NEW



(B9944) GST INC **$120**

FA 510 Network Card for Notebook PC
(81319) GST INC **$154**

10/100 fast ethernet switches



FS 105 5 port 10/100 autosensing (84722) GST INC **$164**	**FS 516** 16 port 10/100 auto-sensing and internal PSU/Vista (60522) GST INC **$899**
FS 108 8 port 10/100 autosensing (70905) GST INC **$280**	**FS 524** 24 port 10/100 switch (77549) GST INC **$1,028**
FS 116 16 port 10/100 autosensing (A5347) GST INC **$549**	**FS 524S** 24 port 10/100 switch - stackable NEW (B6540) GST INC **$1,649**

call **1800 787 638** for 24hr 7 days a week **support**

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Fax: 1300 13 6666 Email: sales@ht.com.au

HARRIS TECHNOLOGY™ @ Target.

SERVERLINK INFINITY

Web Direct www.ht.com.au/cat/comsol

Intelligent KVM Switches

ServerLink to computer cable
Each end of the cable fans out into three connectors. 2m cable for **PS/2** mouse, keyboard and monitor (63972) GST INC **$27**

5m cable (63976) GST INC **$60**

2m cable for **AT/Serial** mouse, keyboard and monitor (63974) GST INC **$26**

5m cable (63977) GST INC **$60**



Control multiple PCs or network servers with a single monitor, keyboard & mouse



3 YEAR WARRANTY

ServerLink Infinity Range

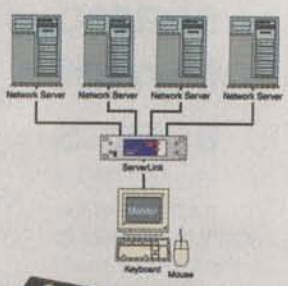
What is a ServerLink KVM Switch?

The ServerLink range of Auto KVM switches allow you to take full control of multiple PCs or network servers with just one monitor, keyboard and mouse. There is no software to load – just plug in your computers, plug in your monitor, keyboard & mouse and you are ready to go. All ServerLink KVM switches are hardware only solutions, totally independent of software and network operating systems. This ensures hassle free installation and error free switching & booting.



On Screen Display

- Select computers via On-Screen-Display or front panel
- Name computers for simple selection
- Mouse & keyboard emulation for flawless booting
- Scan Mode for periodic computer monitoring
- Standard cables used throughout
- Cascadable to control up to 256 computers
- 8 & 16 port models 19 inch rack mounted design
- Australian designed and manufactured



SERVERLINK INFINITY

PS/2 Computers Only

2 Port Model Now Available
FROM **$270**


SL-221

SL-221	2 Port ServerLink Infinity KVM Switch for PS/2 only	(B3047) GST INC **$270**
SL-221-P	2 Port ServerLink Infinity KVM inc. 2 x 2m PS/2 cables	(B3048) GST INC **$310**
SL-421	4 Port ServerLink Infinity KVM Switch for PS/2 only	(A9890) GST INC **$330**
SL-421-P	4 Port ServerLink Infinity KVM inc. 4 x 2m PS/2 cables	(B2759) GST INC **$412**
SL-821	8 Port ServerLink Infinity KVM Switch for PS/2 only	(97888) GST INC **$1,069**
SL-821-P	8 Port ServerLink Infinity KVM inc. 8 x 2m PS/2 cables	(97889) GST INC **$1,239**
SL-1621	16 Port ServerLink Infinity KVM Switch for PS/2 only	(97890) GST INC **$1,796**
SL-1621-P	16 Port ServerLink Infinity KVM inc. 16 x 2m PS/2 cables	(97891) GST INC **$2,127**

PS/2 & AT/Serial Computers

SL-401	4 Port ServerLink KVM Switch for PS/2 & AT/Serial	(63724) GST INC **$737**
SL-801	8 Port ServerLink KVM Switch for PS/2 & AT/Serial	(63777) GST INC **$1,230**
SL-1601	16 Port ServerLink KVM Switch for PS/2 & AT/Serial	(63778) GST INC **$2,069**

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vintagecellars.com.au

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Connectivity where & when you need it

WORK AND PLAY WHEN AND WHERE IT'S MOST CONVENIENT

This gateway lets your whole family share Internet access, personal files, and resources with or without wires. Designed for cable, DSL, or ISDN users, it works with the 3Com wireless LAN, or any other Wi-Fi–certified PC Card or PCI card to provide secure, reliable connections throughout your home.

- Automatically finds and connects up to 35 wireless clients within 91 metres
- Easy to install—no software required
- Configure through any standard Web browser
- 11 Mbps wireless connections are as fast as most corporate wired LANs
- Three high-speed wired connections provide for video editing, sharing DVDs, transferring large files
- Virtual private network support for secure remote access to corporate networks
- Protect your data with a built-in firewall, 40-bit encryption, and a private network ID
- Wi-Fi certification ensures multivendor interoperability

3Com® Home
Wireless Gateway

(B7460) GST INC **$795**



Web Direct

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MOBILE CONNECTIVITY FOR NOTEBOOK PC USERS

For "wired-like" network performance without the wires, choose a 3Com® 11 Mbps Wireless LAN PC Card with XJACK® antenna. Take your notebook anywhere, and connect instantly and securely to any Wi-Fi–compliant device or network without additional configuration. What's more, roam across the enterprise, public spaces, and your home—and stay connected.

- Transmit/receive at speeds up to 11 Mbps and distances up to 100 metres
- Reliable XJACK antenna extends for interference-free reception while in use, and retracts for safety and convenience
- Dynamic rate shifting adjusts connection speeds for more reliable connections
- Auto Network Connect with DHCP support keeps mobile users connected - even while roaming
- Ad hoc support allows for simple peer-to-peer wireless networking
- Dynamic Security Link and 40-bit encryption allow you to exchange information in full privacy
- Wi-Fi certification ensures multivendor interoperability

3Com® 11Mbps Wireless LAN
PC Card with XJACK® Antenna

(C2415) GST INC **$Call**



ICSA CERTIFIED WWW.ICSA.NET Firewall

ICSA Certified 3Com® OfficeConnect Internet Firewalls are approved as effective firewall protection by the worldwide independent authority on Internet security.

PLUG-AND-PLAY WORKGROUP AND BACKBONE SWITCHING

This plug-and-play switch delivers low cost Fast Ethernet switching in a fixed configuration. 10/100 autosensing adjusts automatically to the speed of the attached devices. A 1000BASE- SX Gigabit Ethernet uplink delivers additional power. Mix and match with other 3Com® SuperStack® switches for the combination that suits you best.

- Gigabit Ethernet uplink delivers affordable high-speed technology
- Works with existing SuperStack Switch 1100s and Switch 3300s to protect investment
- Stack any two switches together through an integrated matrix port
- Includes 3Com® Network Supervisor software for optimal management
- Policy enforcement with FastIP, IGMP snooping, IEEE 802.1D, and IEEE 802.1Q VLANs
- Dual queues help prioritize multimedia traffic
- Multicast filtering using IGMP snooping/GMRP optimizes bandwidth for video traffic

3Com® SuperStack®
3 Switch 3300 SM

(C2417) GST INC **$Call**



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DWL-1000AP

D-Link Air Access Point

Fast 11 meg Performance. Build The Size of Your Wireless Network, or Extend Your Existing Wired Network.



NEW Wireless TECHNOLOGY

(A9251) GST Inc: **$995**

FLY BUYS 500 BONUS POINTS

DI-804

Cable/DSL Internet Gateway Firewall /Switch

- Intergrated firewall
- Configurable via Web Browser / Wizard
- 4 port 10/100 Mbps Ethernet Switch
- Broadband Cable or ADSL support
- Supports DHCP and NAT
- Built-in Logon Feature with Telstra BigPond Launch Pad



NEW PRODUCT

(C2361) GST Inc: **$389**

FLY BUYS 500 BONUS POINTS

DKVM-8

8 Port Keyboard, Video and Mouse Switch

"Easy to use, powerful, and scaleable KVM solution" • Controls 8 different server PC's w/ keyboard • Utilizes advanced microprocessor emulation, 2 sets of cables, user friendly interface.



FLY BUYS 500 BONUS POINTS

NEW PRODUCT

(B2656) GST Inc: **$859**

DWL-120

D-Link Air 11Mbps Wireless LAN USB Adapter

The DWL-120 is a high-performance 11Mbps Wireless USB Network Adapter. The DWL-120 wireless adapter allows you to share hard disk drives, DVD/CD-ROM drives, Zip drives, printers and provides shared access to an analogue, Cable, or DSL modem for Internet access



FLY BUYS 500 BONUS POINTS

NEW Wireless TECHNOLOGY

(A8487) GST Inc: **$375**

Collect 500 Bonus Fly Buys points when you purchase A9251, C2361, B2656, A8487 or between 20/05/01 - 30/06/01

DES-1008D

8 Port Fast Ethernet Switch

The D-Link DES-1008D is a powerful desktop Dual Speed 8-port 10/100Mb Ethernet/Fast Ethernet NWay auto negotiating Switch.



(98254) GST Inc: **$239**

DES-1016R

16 Port Switch for Workgroups

Built with advanced functions, these switches are designed for workgroups with advanced requirements. Powerful yet easy to use, they allow users to simply plug any port to either a 10Mbps or 100Mbps node to multiply bandwidth, boost response time and satisfy heavy load demand. Rack mountable.



(98255) GST Inc: **$775**

Description	Part #	GST Inc
D-Link DP-303 10/100 Print Server (3xParallel Port)	(A8876)	$310
D-Link DU-560M External V.90 56K Voice/Fax/Data Modem (USB)	(98261)	$105
D-Link DFM-560I Internal PCI V.90 56K Voice/Fax/Data Modem	(74361)	$60
D-Link DES-3225G 22+2 port 10/100Mbs Mang Switch W/ V-Lan	(90755)	$1,974
D-Link DFE908DX 8 Port 10/100Mbs Dual Speed Hub	(B7830)	$279
D-Link DFE-916DX 16 Port 10/100Mbs Dual speed hub	(87207)	$535
D-Link DFE2624x24-port 10/100Mbps Stackable Dual Speed Hub	(98307)	$1,144
D-Link DP-602 2 Port Internet Network Server	(81535)	$379
D-Link DFE-530TX PCI-Bus 10/100Base TX Fast Ethernet Adapter	(62956)	$44

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Small-Medium Business Networks

NEW

DFE-910

Performance Network Kit

Contains, 2 x10/100 Mb PCI Network Adapters, 1 x 5 port 10/100 Mb Switch, cables, internet sharing software and games.

(88060) GST Inc: **$285**





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DSC-350

Dual Mode Digital Still Camera

Multi-purpose 350k Digital Camera. Record up to still images or 4.5 mintues of video. Max. resolution 1024 x 768. Up to 30 fps at 640 x 480 resolution in WebCam mode. 8Mb of flash memory. Bundled software and accessories.



(B3268) GST Inc: **$312**

DSB-C300

USB Digital Video Camera

This WebCam is a high resolution USB digital video camera. The DSB-C300 supports video with 64 million colours at 30 frames per second and 300k resolution using the high bandwidth of USB interface, and advanced light-sensing CMOS technology. As a fully contained unit, no video capture card or additional hardware is necessary.



(C2364) GST Inc: **$139**

DSB-R100

USB PC Radio

The DSB-R100 provides an easy way to enjoy record and playback FM radio programs. It also supports a flexible tuner function for WAV and MP3 formats,SKIN, audio visualization and Winamp compatible plug-ins.



(C2365) GST Inc: **$59**

DSB-V100

USB Digital Video Capture Device

The compact box provides a powerful interface between a PC and an analog camera/camcorder/VCR. With the video converter, users can carry out video conference, video mail, surveillance and periodic or through bundled video editing software for family movies to record and save digital video.



(C2366) GST Inc: **$159**



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DSS-5+

5Port 10/100 Mps Dual SpeedSwitch

5 port 10/100 Mbps Dual Speed Switch with 5 x RJ-45 ports.Plug-and-Play installation, designed for Gaming, Multimedia and PerformanceUsers.



(89269) GST Inc: **$179**

DFE-902

Gaming Network Kit

The network kit is for 2 users (peer to peer) the gaming network kit contains, 2 x 10/100Mb PCI network card, 1 x 20' Cat.5 UTP Cross-over Cable, diskette with software drivers.



(C2367) GST Inc: **$Call**

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Smart i-Share 56

Wherever two or more PCs are gathered...

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Not all products are in-store, but consulting & advice available on all items

If you have more than one PC, you're going to love Smart i-Share - The Smart Internet Sharing Solution!

Smart i-Share is the Plug & Play networking and Internet access solution for wherever two or more PCs are gathered, but not yet connected. Smart i-Share delivers low cost, high speed Internet and Ethernet connectivity for the home, office and small business.



(A8868) GST Inc: **$454**

Internal router - *Allows 2 or more users to share one modem, Internet account and phone line. Simultaneous, dial-on-demand Internet access.*
Integrated Ethernet hub - *Networks 2 or more PCs together for file and printer sharing.*
Integrated firewall - *Helps prevent unauthorised users from accessing your network. Allows you to control employees' access to Internet and audio / video.*
Extra serial port - *For easy expansion to accommodate an additional modem or ISDN TA. Can be connected to an existing network to provide cost-effective, multiple Internet and email access.*
Embedded Linux open source firmware - *Enables custom configuration for your network.*

- **Smart I-Share provides for up to 4 users. Simply add one or more hubs to connect up to 253 users.**
- **Smart i-Share PCI Network Starter Kits and Smart i-Share USB Network Starter Kits AVAILABLE NOW!**

MyModem 56

Australia's premier modem for office or business!

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Representing speed, stability and reliability, the NetComm MyModem has a proven track record as one of Australia's most trusted business modems to access the Internet, remote access and dedicated point to point communications.

- **K56flex and V.90 connectivity**
- **Leased Line capable**
- **Flash ROM upgradeable**
- **Synchronous data capable**
- **Digital Line Protection**
- **Includes desktop faxing and voice software**

Intra

Internet access and remote dial-in solutions by Netcomm.

HARRIS TECHNOLOGY for all your computer needs!

NetComm's INTRA 2, INTRA 4 and INTRA 8 family of PCI card modems connect your office computer or network to the outside world via multiple phone lines. Combined with off the shelf remote access software, INTRA provides a secure and seamless connection enabling remote users to interact online with you by remote login, by file transfer or by remote network connection.

Onboard dedicated acceleration hardware gives the highest throughput while placing minimum load on your server's processor. Easy to install! You just simply connect your computer and network directly to the phone lines - no fuss, no hassles. All this using only 1 IRQ address.

(A8858) GST Inc **$481**



NETCOMM INTRA 2

(65782) GST Inc **$1,127**



NETCOMM INTRA 4

(90426) GST Inc **$1,780**



NETCOMM INTRA 8

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Pioneer

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Multimedia: DVD-R, DVD-ROM & BLANK MEDIA

Pioneer DVR-S201

*Includes** **Prassi DVD Rep™**
The complete pre-mastering software with copy and record on-the-fly



The DVR-S201 is the world's first DVD-R drive to support the recently released 4.7 GB media of DVD-R Book Ver. 2.0 for Authoring. The DVR-S201 drive is designed for authoring DVD titles that utilize the full capacity of mass-produced DVD-ROM or DVD-Video media. A completed DVD-R disc is ideal to use as a Press Cutting Master Disk. The DVR-S201 drive is also specially designed for authoring applications offering added convenience for creating DVD titles and content with increased efficiency.



INCLUDES DVD Rep writing software & 2 x 3.95GB DVD blank disks

- Disc (Read).. DVD-R, DVD-ROM (Single/Dual Layer)
- Write/Read.. DVD-R (3.95/4.7GB)
- Read.. DVD-ROM (Single/Dual layer Compatible)
- Disc (Write).. DVD-R(3.95/4.7GB Ver. 2.0)
- 1X Write, 2X Read
- (With appropriate supporting software)
- 5.25 inch half height external SCSI model
- **2x DVS-V3950S 3.95GB DVD Blank disks Includes Prassi DVD Rep™ Software**

DVR-S201 (76615) GST Inc: **$9,995**



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Pioneer 16x DVD-ROM Upgrade Kit with Hardware Decoder



• Slot loading 16X drive (40X for CD) with installation accessories • VideoLogic MPEG2 Decoder Card providing output for External Video & Dolby • Digital (5.1) Audio • *Includes 2 DVD-ROM games* (Baldur's Gate & Blade Runner) • Bonus 5 DVD movie rental vouchers from Video Ezy valued at $30 • 2 Year Warranty

DVD-A05SKIT (A4327) GST Inc: **$495**

FLY BUYS 1,000 BONUS POINTS

Pioneer 16x DVD-ROM Upgrade Kit with Software Decoder



• Slot loading 16X drive (40X for CD) with installation accessories • Power DVD Software Decoder • Bonus 5 DVD movie rental vouchers from Video Ezy valued at $30 •2 Year Warranty

BONUS DVD-ROM GAME (worth $90)

DVD-A05SDXE (B0750) GST Inc: **$274**

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FLY BUYS 1,000 BONUS POINTS

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Pioneer DVD-R Media

• Jewel Case • Memory-capacity of 4.7GB • Suitable for DVD Video & Data backup • Playable on both DVD-Video players & DVD-ROM drives • Commercial and Home DVD-Video production • Large sized data archive storage (not for use with Pioneer DVRS201 authoring drive)



DVS-R470SDF (B9971) GST Inc: **$25**
DVS-RP470SDF (C2322) GST Inc: **$30**
• *White printable version*

Pioneer DVD-RW Media

Rewritable DVD media : Jewel case : Memory capacity of 4.7GB: Suitable for DVD video & data : Playable on both DVD-Video players and DVD-ROM drives :Commercial or Home use DVD-Video production (not for use with Pioneer DVR-S201 authoring drive, does suit Apple G4 "Superdrive")



DVS-RW470SD (C2326) GST Inc: **$44**

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Verbatim Slim-line PC Card CD-ROM Drive

"Add a CD-ROM to your Laptop!"



This 24x CD-ROM drive will connect to any PC Card enabled PC or Notebook and is ideal for mobile computing.

(97766)
GST Inc **$328**

PCI Cards

Add super fast serial and parallel port interfaces to any PCI equipped PC.
(90688)
Priced from
GST Inc **$77**



ACARD TECHNOLOGY — MirrorSmart - UltraWide SCSIDE Raid Mirror Subsystem



The MirrorSmart provides complete protection for your important files. Uses RAID1 to allow disk mirroring and rebuilding functions. You will never have to worry about hard disk failure again with the MirrorSmart – providing high data security for a low cost. Features: • Drive Hot SWAP and instant rebuild • Built-in RAID On a Chip(ROC) SCSIDE engine• Uses standard IDE Hard Drives

(B2913) GST Inc **$1,079**

PRETEC — Digital Memory - CompactFlash



With CompactFlash Digital Film you can increase the storage capacity of any compatible digital camera or PDA. CompactFlash card adapters convert CompactFlash into the PCMCIA Type II Card format.

8MB CompactFlash	(B2919)	GST Inc **$66**
16MB CompactFlash	(B2920)	GST Inc **$78**
32MB CompactFlash	(B2921)	GST Inc **$120**
64MB CompactFlash	(B2922)	GST Inc **$205**
128MB CompactFlash	(B2923)	GST Inc **$410**

PRETEC — Digital Memory - SmartMedia



SmartMedia cards expand the storage capacity of any compatible digital camera. The SmartMedia Card Adapter converts SmartMedia Cards into the PCMCIA card standard and is compatible with PCMCIA Type II sockets.

8MB SmartMedia	(B2914)	GST Inc **$35**
16MB SmartMedia	(B2915)	GST Inc **$60**
32MB SmartMedia	(B2916)	GST Inc **$110**
64MB SmartMedia	(B2917)	GST Inc **$220**
SmartMedia Card Adapter	(B2918)	GST Inc **$109**

PRETEC — Flash ATA Cards



ATA Flash Card is a Flash technology based, ATA interface, Type II PC Card using NAND-based flash memory devices to increcease your storage compacity.

8MB Flash ATA	(B9860)	GST Inc **$85**
16MB Flash ATA	(B9861)	GST Inc **$130**
32MB Flash ATA	(B9862)	GST Inc **$150**
64MB Flash ATA	(B9863)	GST Inc **$249**
160MB Flash ATA	(B9865)	GST Inc **$513**
256MB Flash ATA	(B9866)	GST Inc **$825**

* Higher Capacities available

PRETEC — MultiMedia Card Memory



MultiMediaCard is the world's smallest removable flash storage card and employs solid-state memory to deliver rugged and reliable performance to low power, battery-operated devices.

16MB MultiMediaCard	(B9871) GST Inc **$77**
32MB MultiMediaCard	(B9873) GST Inc **$140**
64MB MultiMediaCard	(B9878) GST Inc **$295**

SMARTDISK — FlashPath Floppy Adapters



Works from your PC's Floppy Disk Drive. FlashPath is an electronic device shaped like a floppy diskette – it fits into and works from a 3.5" floppy disk drive allowing you to easily transfer data from your flash media card to your PC by simply using your existing floppy disk drive.

FlashPath SmartMedia Reader	(B2924)	GST Inc **$175**
FlashPath MultiMediaCard Reader	(B2925)	GST Inc **$175**

Digital Card Drives

Exchange data between your PC, laptop, or Digital Camera with our range of PCMCIA Readers/Writers.



USB Port SmartMedia and Compact Flash Card Drive	(B2926) GST Inc **$95**
USB Port ATA Card Drive	(96056) GST Inc **$99**
*SmartMedia Memory Stick and CompactFlash Card Drive	(B9882) GST Inc **$163**
*SmartMedia Secure Digital/MMC and CompactFlash Card Drive	(B9884) GST Inc **$163**

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Copying and Connectivity

Verbatim CopySmart One to One CD Duplicator



Copy discs with a single button press.
No PC required - or connect to your PC or MAC for it to work as two extra drives. PCI SCSI card and connecting cable included.

8x4x32 (B2904) GST Inc **$990**
NEW 16x10x40 (B9843) GST Inc **$1,490**

KOUWELL PCI Firewire Cards

Update your PC with firewire! With the included Ulead Video Software and cable you can download directly from digital video camera to your hard drive. Repeater hubs and cards also available.



PCI Firewire Card – 4 ports	(90689)	GST Inc	**$110**
PCI Firewire Card – 6 ports	(A5161)	GST Inc	**$216**
PCI Firewire Repeater Card – 5 port	(A5162)	GST Inc	**$145**
PCI Firewire Repeater – 6 port	(A5163)	GST Inc	**$154**
PCI Firewire Repeater – 10 port	(A5164)	GST Inc	**$205**
6 pin to 6 pin Firewire cable	(B2905)	GST Inc	**$22**

KOUWELL USB Hubs & Cards

USB has been designed to allow many devices to be connected in a very easy way to a PC or MAC. Most new PC's have USB, but plug-in cards can add USB ports to older machines. The use of a hub enables a single cable to be expanded to as many as 6 cables.



USB Hub – 6 ports	(79702)	GST Inc	**$89**
PCI USB Card – 2 ports	(84801)	GST Inc	**$44**
USB Network Cable	(B2908)	GST Inc	**$75**
USB to Printer Cable	(84803)	GST Inc	**$33**
Internal 3.5" USB Hub – 4 ports	(B2909)	GST Inc	**$77**
USB to 10/100 Ethernet Adapter	(B2912)	GST Inc	**$115**

KOUWELL PCI SCSI Cards

Expand and enhance your PC with a PCI SCSI Card. Common IDE drives in today's PC's slow down your machine every time they read or write to a drive. SCSI works almost completely independently of your PC allowing it to run faster during drive activity.



PCI Bus, Ultra-SCSI	(90681)	GST Inc	**$99**
PCI Bus, Ultra-Wide	(90683)	GST Inc	**$168**
PCI Bus, 2 channel Ultra-Wide	(90684)	GST Inc	**$375**
PCI Bus, Ultra2-Wide	(90685)	GST Inc	**$279**
PCI Bus, Ultra 160	(B9847)	GST Inc	**$529**

KOUWELL ULTRA ATA/100 IDE Acceleration & Expansion Card



PCI IDE Ultra DMA 100 Card: Speed up your PC's new hard disk drives with this PCI plug in Ultra DMA 100 card. Supports transfer speeds of up to 100MB/s with new ATA100 drives, and includes the ability to run up to 4 extra IDE or ATAPI drives on your system.

PCI IDE Ultra DMA 100 Card	(90688)	GST Inc	**$77**
PCI IDE Ultra DMA 100 RAID Card	(B8410)	GST Inc	**$149**

FireWire for Notebook



Adds two FireWire ports to your Notebook with a Cardbus Type II interface.
Plug and Play!
Supports up to 64 devices simultaneously

FireWire to CardBus controller (2 port)
(B9849) GST Inc **$120**

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Introducing USB 2.0. Faster than FireWire. Compatible with existing USB peripherals.

5 port Card (B9850) GST Inc **$139**

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CD Production Equipment

Verbatim CD SERVER DiscZerver Cyclone



CD-ROM and DVD sharing on almost any network.

DiscZerver Cyclone 25 - includes 15GB+ Hard Disk storage.

(B9925) GST Inc **$4,470**

(Higher Capacities also available)

Verbatim FILE SERVER FileZerver



Secure and fast information storage on almost any network

FileZerver 60 Includes 3 20GB Hard Disk Drives.

(B9926) GST Inc **$5,665**

(Higher Capacities also available)

PRIMERA TECHNOLOGY, INC. Signature IV CD Printer

NEW



The new Signature IV CD Printer prints directly onto printable-surface CD-R or DVD-R media. It's 1200x1200 dpi resolution delivers outstanding detail and clarity onto a wide variety of media surfaces. Four distinct print modes allow the user to specify the level of speed and print quality desired, the fastest of which is just 27 seconds per disc.

(B9917) GST Inc **$3,298**

PRIMERA TECHNOLOGY, INC. Composer CD Duplicator

12x CD-R, 4x CD-RW, 32x Read CD duplication system with 50 disc capacity. Burn and Print capable with optional printer.



Composer 12xCD-R Auto Duplicator

(Printer not included) (B8872) GST Inc **$5,435**

PRIMERA TECHNOLOGY, INC. Conductor Printer Autoloader

Print up to 50 CD's on your Signature III/IV or Inscripta printer without having to manually load or unload the discs!



Conductor Printer Autoloader

(Printer not included) (B2934) GST Inc **$3,409**

Unattended Copiers

MICROBOARDS Technology, Inc. Orbit 2 CD Duplicator

Stand Alone CD Duplicator with 1 16x CD-R drive. 50 CD Capacity. An internal CD-ROM Drive holds the master disc being duplicated.



Orbit 2 CD Duplicator

(B9918) GST Inc **$7,658**

MICROBOARDS Technology, Inc. Saturn 2 CD Publishing System

Stand Alone CD Duplictor with 2 12x4x32 CD-RW Drives and in-line colour printer. 150 CD Capacity. Internal 4GB+ hard drive to store your frequently used masters.



Saturn 2 CD Publishing System (B9919) GST Inc **$17,428**

MultiDrive Towers

Verbatim Viking Express

The Viking Express CD Duplicators provide powerful CD-R production capabilities in a modular system. 4, 6 and 8 master drive controller towers can be matched now or later with a satellite 4 or 8 drive upgrade tower allowing up to a total of 16 drives all recording simultaneously.

Now with 16x



Viking Tower Duplicator

4 16x drives	(B9920) GST Inc **$6,439**
6 16x drives	(B9921) GST Inc **$7,988**
8 16x drives	(B9922) GST Inc **$9,534**
4 additional 16x drives	(B9923) GST Inc **$4,780**
8 additional 16x drives	(B9924) GST Inc **$7,754**

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CD-R/CD-RW: Storage for life

CD Recordable - 10 Pack



74 Min.
650MB
1x - 16x
10 pack

(B4329) GST Inc:
$16

Audio CD Recordable and Rewritable



74 min recordable
(A2336) GST Inc:
$2

74 min rewritable
(B4327) GST Inc:
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CD Recordable - Singles

74 Min. 650MB 1x - 16x Singles



(74740) GST Inc:
$2

CD Recordable - Printable Surface

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*Printable surface also available in jewel-case

(93471) GST Inc:
$79

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700MB
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colored CD-R's in matching superslim cases 25 pack

(B1355) GST Inc:
$39

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700MB
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10 Pack

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(77492) GST Inc:
$3

650MB CD Rewritable High Speed 4x - 10x
(B2658) GST Inc:
$5

Accessories

Deluxe
Headset with Mic



- Volume control & on/off switch
- Microphone cover to eliminate distortion

(C2303) GST Inc:
$17

Comfort
Headset with Mic



- Discreet modern shape for easy wearing

(C2304) GST Inc:
$16

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Headset with Mic



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(77819) GST Inc:
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Did you know... Verbatim CD's represent the latest in technology. Featuring a proprietary blue Metal-Azo dye which has the best resistance to sunlight, silver reflective layer for optimum read and write performance and multispeed recording.

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Smart Storage Solutions

- Zip 100MB disk: (23772) GST Inc: $25
- 10-pack: (21889) GST Inc: $210
- Zip PCMCIA SCSI accelerator card (35145) GST Inc: $159
- Zip ISA SCSI Zoom accelerator card (21888) GST Inc: $85
- Zip drive carry case (31823) GST Inc: $49
- Zip parallel cable (46305) GST Inc: $35
- Zip SCSI cable (46304) GST Inc: $35
- Zip disk labels 20-pack (48059) GST Inc: $5
- Zip 6-disk wallet (35146) GST Inc: $30
- Jaz 2GB External Drive (78941) GST Inc: $749
- Jaz 2GB disk (61652) GST Inc: $205
- Jaz 2GB 3-pack (57271) GST Inc: $595
- Jaz 1GB disk (24218) GST Inc: $199
- Jaz 1GB 3-pack (32844) GST Inc: $549

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Predator NEW



Iomega Predator CD-RW drive

Introducing "Predator" - the new, radically designed, compact-sized, top-loading Iomega external CD-RW Drive. Predator is simple to set up using the USB interface, and includes loads of new award winning software, including MusicMatch and Iomega Quik Sync 2, and more.

Predator™ USB Iomega CD-RW External
(B4416) GST Inc: $595

Iomega CD-RW™ USB External 4x4x6
(92623) GST Inc: $475

Predator™ Firewire 8x4x32
(C2413) GST Inc: $Call

Host Powered 250 USB



NEW – Host-powered Zip® 250MB USB drive
Now it's even easier to take your information with you. The Zip® 250 USB drive is now available with a USB cable that provides both data and power, so you don't need any external power source. Its easy to connect (just plug it in) and easy to launch (no rebooting). Also comes with the new U-shaped Zip® 250MB disk. This new drive is compatible with most major operating systems and all Zip 100MB and 250MB Zip disks.

Host powered 250 USB
(B6404) GST Inc: $415

250MB USB Drive
(82633) GST Inc: $410

Iomega CD-RW



Internal Drive

Iomega ZipCD Internal drive is the ideal way to store, share and archive information in a common 650MB format. Compatible with Windows 2000. Also ships with Adaptec Easy CD Creator v4.02c and Direct CD 3.01.

16x10x40
(C2414) GST Inc: $Call

12x10x32
(B0882) GST Inc: $495

HipZip



Announcing Iomega's new HipZip™ Digital Audio Player. With its sleek design, this palm-sized player lets you download your favourite MP3 & Windows Media format tunes from the internet, & play them anywhere. The HipZip™ also acts as a PocketZip storage device: download & transport music, spreadsheets, images, etc, up to 40MB per disk.

(B1436) GST Inc: $550

QuikSync3 NEW



Transparent and simultaneous backup software for network drives, hard drives or removable storage drives - including all Iomega drives.

(C0041) GST Inc: $45

PocketZip

PC Card Drive



Removable solution for notebook users. Store, protect and share important information on a 40MB PocketZip (1 disk included).

USB docking station
(A2306) GST Inc: $95

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(78902) GST Inc: $190

(B9715) GST Inc: $45

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BUSlink Hard Drive. Technology the easy way.



BUSlink FireWire Hard drive is a fast, easy way to add additional storage to your computers. You simply plug the FireWire card supplied into any PCI slot and you're set to go. Of course, it is Hot Swap capable! BUSlink FireWire has a transfer rate of 400MB/sec or 30 times faster than those USB hard drives. Making BUSlink FireWire Hard Drive ideal for digital video editing and any high speed, high capacity hungry tasks.

- AVI, movie storage
- back up
- file storage
- games storage
- portability
- MP3 file storage
- photo storage



20Gb Package
(B4518)
GST Inc:
$649



Stand the drives upwards to save desk space, and for extra hard disc storage, simply stack up more BUSlink FireWire Hard Drives.

12 Month Warranty, No drivers necessary, package includes FireWire card suitable for a PCI slot and 2m FireWire cable.



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Powerful 2D/3D Video Graphics Card



Millennium G450
(B6886) GST Inc:
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The undisputed industry leader in 2D and 3D Image quality.
Matrox Millennium G450 Dual Head Graphics Acceleration Card
The Matrox pioneered DualHead display, introduced and made popular by the award winning Matrox G400 series, making the millennium G450 the most versatile and feature-rich graphics card on the market today. DualHead offers a host of display features and software utilities that will change the way you work and play on your PC.

DualHead Display offers a host of options designed to meet your particular needs.
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- DualHead Zoom
- DualHead DVDMax
- DualHead TV Output
- DualHead Clone

Incredibly Sharp and realistic image quality
- UltraSharp, Lightning-fast 360MHz RAMDAC
- Vibrant Color Quality (VCQ2)
- Environment Mapped Bump Mapping which adds a new level of visual realism to many game environments
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Powerful 2D and 3D acceleration
- Matrox G450 256-bit DualBus
- 3D Rendering array Processor
- Advanced AGP support
- Over 35 games that support Environment-Mapped Bump Mapping (EMBM), or DualHead including: Star Trek, Armada, Baseball 2000, Destroyer Command, Battlezone II, Combat Commander, The Rift etc.

G45+MDHA16DB
OEM (B3110) GST Inc: **$289**

G45+MDHA16LXB
OEM (C0015) GST Inc: **$210**

Millennium Dual Head G450 16Mb DDR no cable or software OEM



G45+MDHA32DB
OEM (B3111) GST Inc: **$387**

G45+MVTA32DRi
OEM (C0016) GST Inc: **$665**

Marvel G450e TV (PAL) 32Mb DDR inc Matrox PC-VCR and Matrox DVD Inc Ulead Videostudio 4.0 and Ulead Photo Explorer 6.0

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Does your mouse ever stick, skip or hang?

IntelliEye Technology Is Your Answer

The small rubber ball in the bottom of your mouse can pick up dust and lint that hurt performance. IntelliEye optical technology replaces the mouse ball with an optical sensor that has no moving parts to get dirty and hurt performance. IntelliEye optical technology gives you a new level of control and precision, and you'll never need to clean a mouse ball again.

Benefits of IntelliEye Technology

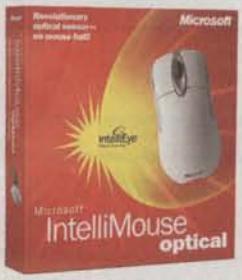
- With no mouse ball to get dirty, the IntelliEye sensor stays precise.
- The IntelliEye sensor works on hundreds of surfaces, so you no longer need a mouse pad. Use it on your desk, the kitchen counter, or even your pant leg!
- The recessed lens never touches your desk so it stays clean. There's no mouse ball to take apart and clean
- On IntelliMouse Explorer, you can use the programmable buttons to navigate Forward and Back on the Internet, or reprogram them to your favourite commands in most applications.

How It Works

IntelliEye uses a tiny CMOS digital camera to take 1,500 pictures per second of the surface beneath the mouse. A digital signal processor then analyses these pictures and translates movement of the mouse into crisp movement of the cursor on your computer screen. IntelliEye uses a powerful 18 MIPS processor to give you great performance. In fact, this processor is so advanced that it is faster than a computer built several years ago.

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Intellimouse Optical

This is the second generation of Microsoft mice to use the breakthrough IntelliEye optical sensor technology. The optical sensor provides smooth and precise movement. Optical also is equipped with a wheel for efficient scrolling and has additional buttons to enhance forward and back navigation on the Internet.



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(98271) GST INC: **$67**



Wheel Mouse Optical

Brings all the precision and durability of IntelliEye Optical technology to a simple, affordable mouse. Revolutionary optical sensor - no mouse ball.

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(A8710) GST INC: **$45**



Intellimouse Explorer

Featuring the most significant improvements to the mouse since it was invented 30 years ago. Intellimouse Explorer is the first mouse to give you superior precision.

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(84211) GST INC: **$75**

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Internet Keyboard Pro

The Internet Keyboard Pro gives you high-quality design with one-touch access to the Internet, your e-mail, and your favorite multimedia controls.
Use the My Computer and Calculator Hot Keys for quick access to these popular Windows ® features, or customize the 19 Hot Keys to launch your favorite programs or documents. Two USB ports allow you to plug USB devices directly into your keyboard and the detachable palm rest means that you can rest your palms comfortably while not typing.

FLY BUYS 5X BONUS POINTS

(A1783) GST INC: **$67**



Natural Keyboard Pro

With 19 hot keys, the Microsoft® Natural® Keyboard Pro gives you one-touch access to the Internet, your e-mail, and your favorite multimedia controls. Combining this with its powerful IntelliType Pro software and built-in USB ports, the Natural Keyboard Pro combines comfort and control to let you work efficiently.

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(87385) GST INC: **$88**

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Surround Yourself With The Very Best

Cordless MouseMan® Optical



This comfortable mouse for either hand combines advanced cordless and optical technologies. Digital Radio technology works in a two metre range without being pointed at the computer. Digital Security IDs lock out interference and make the receiver only listen to one mouse. Logitech's smart power management allows the mouse to work for months on the included AA batteries. The low battery indicator gives plenty of warning before needing to change batteries . PC/Mac. 5-year warranty.

(C1186) GST Inc: **$147**

QuickCam® Traveler

QuickCam Traveler combines easy web communication with the freedom of a digital still camera. It's loaded with features - like a self-timer, macro setting and storage for up to 200 shots. You can adjust resolution or delete duds, then instantly zap the shots into your computer. QuickCam Traveler is also a video camera that plugs into your PC for all kinds of Internet video: video-conference, video-mail, video-greetings, live broadcasting, animation, even remote video surveillance! With the included video editing software, you can create titles and transitions, add music, narration, sound effects and more!



(A8024) GST Inc: **$275**

QuickCam® Pro 3000



With its CCD sensor, QuickCam Pro 3000 takes pictures and videos with true 640x480 resolution. Use its built-in microphone to make live video calls over the Internet and send pictures and videos with your emails. QuickCam software lets you easily setup a digital surveillance camera and broadcast live video and audio over the web. Add professional titles, fades and wipes to your videos with the included MGI software.

(B0805) GST Inc: **$195**

QuickCam® Web



Logitech QuickCam Web has everything you need to capture video, send video e-mail, make live video calls, post web albums, broadcast over the Internet and more. With its integrated microphone and excellent assortment of easy-to-use software, QuickCam Web is the perfect Internet video camera for everyone.

(A2833) GST Inc: **$158**

SoundMan® S-20



Delivers high-definition sound, solid bass for your favourite CD/MP3 songs. Compact, attractive styling. Remote control with headphone jack. Includes digital music CD. 2-year warranty

(A5011) GST Inc: **$89**

Marble® Mouse



Logitech Marble Mouse fits right and left hands like a mouse yet works like a trackball. Save space while reducing hand and wrist movement. Patented Marble optical technology provides superior precision and smooth motion without regular cleaning. Marble Mouse works with PC's and USB-port Macintosh systems. Three-year warranty.

(B7946) GST Inc: **$85**

Cordless Freedom™ Navigator

Logitech's digital radio technology guarantees a reliability that other cordless devices just can't match. iTouch™ keys offer fast access to the Internet and multimedia. Includes Cordless MouseMan Wheel. 5-Year warranty.



(B1477) GST Inc: **$180**

Cordless Freedom™ Pro

Ideal cordless keyboard and mouse combination for exceptional comfort, cordless freedom and aesthetic design. The split layout with a gentle curvature makes it easy to use. iTouch™ keys for easy access to the Internet and multimedia. 5-Year warranty.



(B1478) GST Inc: **$215**

Optical Mouse

(B9948) GST Inc: **$49**

Cordless TrackMan FX

(B0831) GST Inc: **$148**



Cordless TrackMan Wheel

(A2157) GST Inc: **$110**



Cordless Mouse

(C2310) GST Inc: **$83**



Deluxe Access 104 Keyboard

(B0819) GST Inc: **$38**



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Xircom RealPort II

The Evolutionary RealPort Integrated PC card With Built-in Connectors and Mix-and-Match Flexibility

Real Port 2 Integrated PC card can be used alone or mixed and matched with other Real Port2 cards to meet individual needs for personalised information access now and in the future. The innovative design enables notebook users to select from a broad range of access technologies including 56Kbps modem, Ethernet, ISDN, GSM, Wireless Ethernet and easily combine the cards together for a customised solution. Eliminate unnecessary cables, purchase only what you need now and add on later. RealPort 2 also enables you the flexibility to adapt to future technologies such as Wireless Ethernet and Bluetooth, whilst saving battery life on your notebook. RELIABLE, EASY and FLEXIBLE.



RealPort2 Global Access Modem (92739) GST Inc: **$420**

RealPort2 10/100 Ethernet Card 16 bit (92746) GST Inc: **$310**

RealPort2 CardBus 10/100 Ethernet 32 bit (92756) GST Inc: **$320**

Xircom Wireless LAN Solutions

Wireless Ethernet WLAN (Wirless Local Area Network) Solutions

Wireless Ethernet (WLAN-802.11b) technology links the wired network to wireless users.

Secure performance... standard base (802.11b), wirelss connectivity to existing network infrastructure, eg. in public areas or meeting rooms

Flexability... set up a hassle free, cost-efficient network that is fast, secure and easy to use without laying wires or reconfiguring work space.

Easy to set-up... Allows groups to set up temporary (ad-hoc) wireless networks with flexibility and ease.



Fast access... check email, browse the internet and access the company network anywhere within a building or campus at speeds comparable to a wired LAN.



▲Wireless Ethernet Accesspoint

(C2300) GST Inc: **$Call**

◀ CreditCard Wireless Ethernet Adapter, 40-bit standard WEP encryption

(B4404) GST Inc: **$375**

CreditCard Wireless Ethernet Adapter, 128-bit strong WEP encryption

(B4405) GST Inc: **$399**

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Video clip capture in Microsoft AVI file format - from TV or any video sourceVideo conference over the Internet with Microsoft NetMeeting or CU-SeeMe.

Create AVI's and send them to friends via e-mail.

Compatible with Win 95/98/NT 4.0/Win2000 & Linux

Hauppauge TV	(89063) GST INC	**$140**
Hauppauge TV GO - FM	(89064) GST INC	**$186**
Hauppauge TV USB	(89066) GST INC	**$244**
Hauppauge TV USB - FM	(98455) GST INC	**$285**
DV Wizard	(A8925) GST INC	**$245**







Hauppauge PVR

Personal Video Recorder



- Watch and record your TV shows with instant
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- Pause your TV shows, replay them at any time!
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PCI (B2593) GST INC **$669**

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Precise, fast MPEG 1&2 encoding straight from the editing timeline.

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EZDV

with Media Studio Pro V6.0
(A8924) GST INC **$749**
with Premiere V6.0
(C0023) GST INC **$799**



DV RAPTOR

(A8997) GST INC **$999**
with Adobe Premiere V6.0
(C0024) GST INC **$1,382**

DV Storm

Introducing DVStorm, a real-time DV editing system that combines a high performance feature set with stability, reliability, and affordability. Boasting render-free, real-time digital video editing, DV and Analogue input/output, MPEG output for DVD, plus Web streaming capabilities, DVStorm is the ultimate digital video editing experience!



DV STORM

with Adobe Premiere V6.0
(C0025) GST INC **$3,432**

VIDEO FACTORY

Make movies in minutes



VideoFactory™ is designed to help you make home movies, web videos, and corporate presentations in a matter of minutes.

Easy to use; VideoFactory provides a straightforward, intuitive Windows interface that allows you to spend less time learning the software and more time producing great videos.

Fast results; VideoFactory automatically displays edits and effects in real time—no rendering is required for previewing changes.

Getting Started tutorial; VideoFactory includes an online start up tutorial that takes you through the video creation and editing process.

Hundreds of effect and transition combinations allowing you to make your video unique.

Video Factory
(A9258) GST INC **$195**

Sound Forge 5.0
FULL VERSION
(B8616) GST INC **$850**
Sound Forge XP 5.0
LIGHT VERSION
(B8619) GST INC **$130**



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HP LaserJet 6L Pro



(B4399) GST INC **$587**

• 6ppm • economode cuts printing costs by 50% • power save mode reduces energy costs • 18-second first page out • patent instant-on fuser eliminates printer warm-up time • fast return to application • supports a wide variety of media sizes and types (letter, envelopes, transparencies and card stock) • Supports DOS and Windows 3.1, 3.11,95,98,NT 4.0 environments

HP LaserJet 1200 Series

HOT NEW PRODUCT



LaserJet 1200 (base unit) (B9799) GST INC **$765**

LaserJet 1200n (B9958) GST INC **$1,280**

• 15 ppm A4 (best-in-class) and first page out in less than 10 seconds •increased memory of 8MB of RAM (upgradable to 72 MB) •protected 250-sheet input tray and 10-sheet priority feed tray •improved duty cycle of up 10,000 pages •instant-on fuser eliminates warm up time

You can now enjoy the comfort of printing,

LaserJet 1220 (B9968) GST INC **$917**

You can now enjoy the comfort of printing, colour scanning and copying from one machine by simply adding the copier/scanner attachment to your hp LaserJet 1200. Beside enjoying all the best-in-class printing capabilities of the hp LaserJet 1200, you can now take control of your document management with the added benefit of colour scanning and copying.

HP LaserJet 2200 Series

HOT NEW PRODUCT



LaserJet 2200d (base unit) (B9956) GST INC **$1,519**

LaserJet 2200dn (B9957) GST INC **$2,005**

LaserJet 2200dtn (B9898) GST INC **$2,559**

• Improved productivity with faster printing at 18 ppm A4 •best printing resolution of true 1200 x 1200 dpi at full speed •quicker return to application with 133 MHz processor • first page out in 15 seconds with instant on-fuser •print large and complex documents quickly and easily with 8 MB of standard memory (16 MB memory on hp LaserJet 2200dtn) – expandable up to 72 MB •increased duty cycle to 40,000/month

HP LaserJet 4100 Printer

HOT NEW PRODUCT



LaserJet 4100 (base unit) (B8399) GST INC **$2,188**

LaserJet 4100n (B8400) GST INC **$2,945**

LaserJet 4100tn (B8401) GST INC **$3,420**

LaserJet 4100dtn (B8402) GST INC **$3,950**

• Super fast printing at 24ppm A4 print • 250MHz processor ensures quicker return to application • complex documents print faster with 16MB/32MB memory • 12 second first page out • HP Pro-Res & FastRes 1200 dpi print quality at full speed • dynamic RIP-once for faster processing of multiple original prints • duty cycle of 150,000 pages/month

HP LaserJet 3200 Series



Printer, Fax, Copier, Scanner! (C2332) GST INC **$1,490**

An ideal business solution for small office, home office (SOHO), small/medium business and top level executives, the hp LaserJet 3200 series is four machines in one. Print, fax copy and scan from one machine and it only occupies 1.6 sq. ft. of your desk space!

HP LaserJet 8150 Series



HP Laserjet 8150 (B1981) GST INC **$4,325**

HP Laserjet 8150DN (B1982) GST INC **$5,660**

HP Laserjet 8150N (B1986) GST INC **$4,945**

The new HP LaserJet 8150 series is designed to grow with your business and its needs. It delivers high-volume, high-speed black and white prints and copies for small workgroups to large departments.

HP LaserJet 4550 Series



HP Colour Laserjet 4550 A4 16PPM 64Mb (B2381) GST INC **$3,930**

HP Colour Laserjet 4550N A4 16PPM 64Mb 10/100 (B2382) GST INC **$4,450**

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HP DeskJet 930C



Compact Photo-Quality Colour InkJet Printer • Alternative 2400x1200dpi mode on photo paper with HP PhotoREt 3
• Excellent results on all types of media in all modes
• Prints up to 9ppm black and 7.5ppm colour

(95761) GST INC **$255**

HP DeskJet 990C



Best Photo-Quality plus Premier Business Printing • Infrared printing from PDAs, notebook computers, and other mobile devices. • Up to 17 ppm in black, 13 ppm in color • Optical sensor detects paper type, then selects the ideal print mode HP PhotoREt III

(B1967) GST INC **$703**

HP DeskJet 840C



HP's creative photo-quality colour, speed & flexibility
• Photo quality with HP PhotoREt II
• Alternative 600x1200 dri mode on photo paper
• Prints up to 8 ppm black and 5 ppm colour
• Exclusive HP inks dry fast for smudge-resistant text and images

(A2289) GST INC **$211**

HP ScanJet 7400C



Lightening fast speeds - 2400dpi colour quality
• up to 2400dpi with true 48bit colour
• lightening fast speeds - preview in 4 seconds
• transparency adapter
• SCSI & USB capability
• Precisionscan Pro 3.0 with integrated OCR

(B9949) GST INC **$978**

HP ScanJet 4300C



Scan/copy/e-mail from a brand you can trust
• WYSWYG compatability
• Dual I/O: USB & Parallel
• 600 dpi optical - 36 bit colour
• Windows 2000 support
• Precision Scan LTX software
• Corel Print House 2000

(A2286) GST INC **$189**

HP ScanJet 5300C



One-step access makes it easy to scan, copy, e-mail, or fax your images
• Ideal for: Office managers wanting versatility and expandability & first-time scanner users • Optical resolution 1200 dpi, enhanced resolution 9600 dpi, bit depth 36-bit • Maximum document size 8.5 x 11.7 in, 8.5 x 14 in with optional ADF

(93770) GST INC **$389**

HP Papers

Premium Plus Photo Paper Glossy A4, 20 sheets
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HP Premium Photo Paper A4, 15 sheets
(54010) GST Inc: **$14**

HP Premium Photo Paper A3, 20 Sheets
(58635) GST Inc: **$54**

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7. Backed by Customer Care



(80568) GST INC **$357**

HP OfficeJet T65

All In One Scanner/Printer/Fax/Copier (84893) GST INC **$452**

• Up to 11ppm mono and 8.5ppm colour •75 page memory •Colour fax capability • 100 speed dials with 10 one-touch keys • junk fax barrier, 20 group speed dials fax forwarding • Colour scanning - up to 1200dpi enhanced 300 x 600 optical 24 bit colour • walk -up colour copy , up to 99 copies from original



HP OfficeJet G85

All Colour: Printer, Copier, Scanner & Fax

(A0062) GST INC **$1,130**

Prints at up to 12 ppm black, 10 ppm color using 2400x1200dpi colour with HP photoREt 3,as well as flatbed exceptionally high-quality 36-bit scanning, faster copying speeds, and upgradeable networking capability which allows one unit to be shared by several PCs. Each model combines a color printer, scanner, and copier. Also a convenient walk-up color fax.



HP CDRW 9140i & 9500i

Model	9140i	9500i
Speed	8x4x32	12x8x32
Copy & create universally readable CDs	HP MyCD	HP MyCD
CD creation using drag & drop	Adaptec Direct CD 3.01	Adaptec Direct CD 3.01
High speed CD-RW disc formatting	HP Fast Format	HP Fast Format
Full system backup	HP Simple Backup	HP Simple Backup
Mutlimedia organiser		Broderbund Multimedia Pro
Create stationery, greeting cards & more		Corel Print Office 2000
MP3 downloads	HP Music Jukebox	HP Music Jukebox
CD labelling	CD labeler	CD labeler
Included media	1xCD-R	1xCD-R, 1x high per. CD-RW
Buffering	2MB	4MB
Able to create all type of CDs	Yes	Yes
Able to format CD-RW disc under 3 minutes	Yes	Yes
Able to do a full system backup	Yes	Yes
Download MP3 files & store on CD	Yes	Yes
Download MP3 files onto CD to play in a discman	Yes	Yes
A solution with a CD labeler	Yes	Yes
Write & read high performance CD-RWmedia	Write- No, Read- Yes	Yes
Write & read normal CD-RW media	Yes	Yes
Write & read CD-R media	Yes	Yes
Part # Inc GST	(A8090) **$325**	(A8087) **$560**



Easiest to Install & Use!

You can create data CD's, audio CD's, photo CD's and multimedia CD's. You can either write once (CD-R) or erase and re-write (CD-RW). Each CD holds up to 650MB if data or 74mins of audio.

HP CD-Writer 8230e Drive

Free Philips Headphones - See Sidebar! (A9131) GST INC **$489**



The HP CD-Writer 8230e drive is an external CD-Rewriteable drive with 4x4x 6x performance. Use the drive to create, share, and store data, photos, music, and more on high capacity CDs. Record up to 650 megabytes (MB) of data with CD-writeable (530 MB formatted) and 650 MB (up to 618 MB formatted) with CD-readable. Use the drive to backup and secure your system to keep files safe, accessible, and transferable. Use the drive with the HP Simple Backup Software to quickly and easily restore an entire computer system.



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FREE PHILIPS SBC-HS800 Earphones **$59.95 RRP** with every **HP CD-W 8230e** sold along with **FREE** MUSICMATCH Software and a **FREE** Step-By-Step Guide to CD Creation.

12 May 2001 - 30 July 2001 or whilst stocks last. (Mail-in redemption)

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HP PhotoSmart

PhotoSmart P1000 Printer

The HP PhotoSmart P1000 printer is an ideal desktop printer for everyday printing and more. The printer provides direct printing from many digital cameras, plus wireless printing from the HP PhotoSmart C500 digital camera. Users will see results that look as good as an original photo, thanks to HP's enhanced color-layering technology, PhotoREt III. The HP PhotoSmart P1000 printer prints up to 11 pages ppm black and 8.5 ppm color.

- 2400 x 1200 dpi resolution in color on photo paper.
- Up to 600 dots per inch (dpi) in black.
- USB and parallel connectivity.
- 4-inch x 6-inch photo tray.



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(86556) GST INC **$559**

FLY BUYS. 1,000 BONUS POINTS

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PhotoSmart 215 Digital Camera

1.3 MP resolution; Fully automatic operation, including auto focus, flash and exposure. Just point and shoot; Fast PC connect via USB; 2x digital zoom, 1.8" color LCD and removable 4 MB CompactFlash™ card.

- Autoflash with red-eye reduction lets you shoot under all light conditions.
- Store up to 36 photos with 4 MB CompactFlash memory card.
- Fully automatic for point and shoot simplicity.
- High-quality photos with 1.3 megapixel resolution.
- Capture close-up photos with 2x digital zoom.
- Instantly review your photos on 1.8" color LCD.



FLY BUYS. 1,000 BONUS POINTS

(B1972) GST INC **$419**

Swann COMMUNICATIONS

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Modems & FireWire

SWANN SPEED DEMON MODEM

- Perfect for the low budget concerned user.
- 56K SVD voice/data/fax modem.
- Driver and bitware included.
- 12 month warranty.



(87970) GST INC: **$105**

SWANNSMART TURBO MODEM

- New flash upgradeable V.90 modem chipset.
- Full Fax & ASVD voice capability.
- Bonus WebWorks 2000 CD ROM.
- 5 year 'Hassle Free' warranty.
- 30 Day satisfaction guarantee.



(B1846) GST INC: **$145**

SWANNSMART USB MODEM

- Bus powered – no need for extra power supply cables.
- Compact, innovative design fits easily on the smallest desktop.
- Easy plug-and-play installation: simply plug into a USB port.
- Bonus 'WebWorks 2000' CD ROM.
- 5 year 'Hassle Free' warranty.



(B9930) GST INC: **$115**

FIREWIRE PCI CARD

- Includes 3 Port PCI Card and simple to install instructions.
- Upgrade your PC to IEEE 1394 – The Standard in high-speed date transfer.
- Simple automatic installation – Plug & Play (requires Win 98 SE or later).
- Instantly connect FireWire Devices such as printers, scanners, CD writers/recorders, external HD's & more.
- 3 year warranty.



(C2308) GST INC: **$99**

SWANNFIRE CARDBUS

- Allows user to connect DV accessories and FireWire peripherals to their notebooks.
- 400Mbps transfer rate.
- 12 months warranty.



(C2307) GST INC: **$149**

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(94493) GST Inc:
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Kodak Gold 10 Pack
(C1402) GST Inc:
$18

EXTRA 32MB PIC CARD FREE with the DC4800 Camera while stocks last or until further notice.

EXTRA 16MB PIC CARD FREE with the DC3800 Camera while stocks last or until further notice.

KODAK PICTURE CARDS

32MB Picture Card
(62677) GST Inc:
$142

64MB Picture Card
(82249) GST Inc:
$236

96MB Picture Card
(88332) GST Inc:
$390

Kodak MC3 portable media device



All the multimedia you've ever wanted in one little player. Click into digital video mode to shoot funny movies or snap a few digital pictures. Download your favorite MP3s and take them with you, listening via ear buds or through your boom box or car stereo. It's one of the only MP3 players with a reflective color preview screen, so you can use it even in bright sunlight. Transferring to your PC is a breeze.Then you can share your memories over the Internet or print them out. It even lets you combine your pictures, music and video into unique video clips or music videos.

(B9818) GST Inc: **$425**

Kodak DX3500

NEW!



Get shooting right away with 8MB of internal memory. The DX3500 also has a COMPACTFLASH memory expansion slot so you can take more pictures. Focus on what's important with its 3X digital zoom. 2.2MP resolution provides photo-realistic prints up to 8"x10". The optional KODAK Camera Dock lets you send pictures from your camera to your computer with just the touch of a button. KODAK Picture Software lets you instantly view, edit, e-mail, and print your pictures.

KODAK DX3500 (C2151) GST Inc: **$Call**
CAMERA DOCK (C2155) GST Inc: **$Call**

Kodak DC4800



For passionate digital photographers or those needing the highest possible quality or the widest creative control. Compact size. 3.3 megapixels - super crisp resolution allowing prints up to 11"x17". Six image qualities, from e-mail to uncompressed Tif. Variable ISO settings (100, 200, 400). Wide angle 3x optical zoom plus 2x digital zoom. Lithium Ion rechageable battery (rechargeable in camera). Manual & auto settings. Variable colour balance. TTL AF. Special effects. Lens threaded for additional external lenses. Burst capture mode.*

(A3295) GST Inc: **$1,180**

Kodak DC5000



Rugged, durable, and easy-to-use, the KODAK DC5000 will help you get the job done. The DC5000's weatherproof body will hold up under the toughest circumstances. Two-megapixel resolution provides you with excellent picture quality even on 8" x 10" prints. The 2X optical (30 – 60 mm) and 3X digital zoom let you choose wide angle or telephoto to take pictures in a variety of open spaces. All in all, a practical, intuitive package that is as easy to use as a point & shoot, but tough on the job

(A3540) GST Inc: **$1,009**

Kodak DC3800



The KODAK DC3800 Digital Camera is the sleek, high-performance, easy-to-use digital camera. Its small size makes it pocket-perfect. The 2.1MP resolution delivers detailed, vibrant pictures on screen and paper. And the 2X digital zoom lets you focus on what's important. The USB COMPACTFLASH Card Reader makes it easy to upload your pictures and its point-and-shoot design makes it user-friendly.

(B1252) GST Inc: **$699**

Kodak DC3400



• Two-megapixel resolution means exceptional detail and brilliance – up to 8" x 10" prints. • Its 2X optical zoom delivers crisper close-ups, and its 3X digital zoom lets you get even closer. • User-friendly controls make the DC3400 quick to learn & easy to use. • Zoom Digital Camera, ensuring high quality & no-nonsense performance. • Get connected quickly & easily with its USB and serial cables - it's easy to download, organize, and e-mail your pictures. • Print your pictures with convenience from your own printer.

(A5579) GST Inc: **$799**

Kodak PM200 printer



The most distinctive feature on the Personal Picture Maker 200 is its 1.8-inch, full-colour, LCD preview screen just like those on digital cameras. You don't even need to be connected to a PC, you just insert a memory card from a digital camera (the PPM200 accepts both Smart Media and Compact Flash formats) to print. The preview screen allows you to scroll through all the images on the card, select those to print, choose the number of copies, and in what size and layout. Compatible with Microsoft Windows 98 and Millennium Edition, it connects easily via a USB port.

(B3084) GST Inc: **$549**

Kodak DC3200



Capture fun and spontaneity with the DC3200. One megapixel resolution means eye-catching e-mails and prints up to 5" x 7". Its 2X digital zoom delivers great detail. Two megabyte internal memory and COMPACTFLASH Card capability keeps you shooting longer. And its LCD screen lets you preview your pictures with ease.

(B1255) GST Inc: **$425**

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NEW! Canon Powershot Pro90 IS

Introducing the New Canon Powershot Pro90 IS, developed with the specifications and performance that advanced amateurs and image professionals demand. It combines outstanding image capability 2.6 mega-pixels with true 10x optical zoom and Image Stabilising technology. The Pro90 IS features a vari-angle LCD monitor, a brand new electronic viewfinder and continuous autofocus as well as flexibility and ease of handling.



(B9936) GST INC **$2,764**



NEW! Canon BJC-55

The BJC-55 includes Li-ion battery and International power supply. Text smoothing up to 720 dpi, fast black text printing up to 5 ppm and high quality colour is standard. New optional PhotoRealism print head & colour tanks (BC-12e) will further improve photo quality results. Advanced drivers & easy connectivity for Windows or Mac via USB ports or IRDA infra red communication for suitably equipped Windows PC's. Scanning is possible with the optional IS-12 scanner cartridge.

720 X 360dpi (B9842) GST INC **$578**

NEW! Canon S400 Bubble Jet Printer

New Brilliant inks enhance printing performance out of the box. 1440 dpi resolution, Drop Modulation Technology for all inks, individual ink tanks with ink level detection, dual cartridges and bi-directional printing, high speed & quality go hand in hand with reductions in operating costs. Advanced printer drivers incorporate Image Optimiser & Photo Optimiser for superior photo quality. Dual interface for parallel & USB.



1440 X 720dpi (B9834) GST INC **$245**



NEW! Canon S800 Bubble Jet Printer

Photo Lab printing on your desktop. The S800 printer features Microfine Droplet Technology & printing resolutions up to 2400 x 1200 dpi. Superior dot placement with star shaped nozzles further enhance the photo printing process. Superior economy is maintained with each colour ink tank separately replaceable from the print head. Improved colour ink formulas give better light fastness for long life printed results on PR-101 Photo Paper Pro. Superior new printer drivers include Photo Optimiser Pro and Photo Record image browser is now included to make Photo Printing even easier.

1200x2400dpi. (B9836) GST INC **$619**

NEW! Canon S4500 Bubble Jet Printer

A3 photo printing.1440 dpi resolution, Drop Modulation Technology for all inks, individual ink tanks with ink level detection, dual cartridges and bi-directional printing, high speed & quality go hand in hand with reductions in operating costs. As standard the BC-30e print head with black ink tank, BC-31e print head with Cyan, Magenta & Yellow ink tanks gives high quality colour results and black text printing up to 9 ppm without sacrificing quality. Advanced printer drivers incorporate Image Optimiser & Photo Optimiser for superior photo quality, plus Simulated Illustration & Sepia effects. Optional; BC-32e PhotoRealsim cartridge. Dual interface for parallel & USB.

1440 X 720dpi. (B9838) GST INC **$637**





NEW! Canon CanoScan D1230U Flatbed Scanner

The D2400U features a real aluminium lid, 1200x2400dpi CCD sensor, *superior optics*, USB connection, pro-quality 48bit input / 42bit output. Bundled with Adobe PhotoShop image editing & OmniPage OCR software. Large format film adaptor unit can also be purchased as an optional extra.

1200x2400dpi. (B9935) GST INC **$426**

NEW! Canon CanoScan D2400U Flatbed Scanner

The CanoScan D2400U features a stylish aluminium lid, 2400 X 4800 dpi 'Hyper CCD' sensor, superior optics, professional quality 48 bit input & output and a high-intensity large format film-scanning adaptor as standard. Connected via a fast USB interface, the CanoScan FB 1210U comes with Adobe PhotoShop for full 48-bit compatible image editing and ScanSoft OmniPage Optical Character Recognition software.



2400x4800dpi. (B9840) GST INC **$854**



NEW! Canon CanoScan D660U Flatbed Scanner

With 42 bit output for Windows 98, 2000 and USB Mac Systems. Fast one pass USB scanning. 600x1200dpi film scanning via film adaptor built-in to scanner lid.

1200x2400dpi. (A8903) GST INC **$259**

ALL NEW PRODUCTS!

BJC-1000SP

360x720dpi (A1792) GST INC **$118**



BJC-2100SP

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DuoScan T2500 SCSI-2. 36 bit. Transparency scanning. True opt. res. 2500 x 1250ppi (74499) GST Inc: **$7,946**



DuoScan HiD (92981) GST Inc: **$3,650**

Document Feeder DuoScan T1200 (75581) GST Inc: **$405**

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1200x2400ppi (9600ppi maximum), 42bit flatbed scanner with USB interface.Software package includes Agfa ScanWise, ReadIris and Corel PrintOffice 2000. Compatible with Win98/2000/Me - MacOs

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(99759) GST Inc: **$390**

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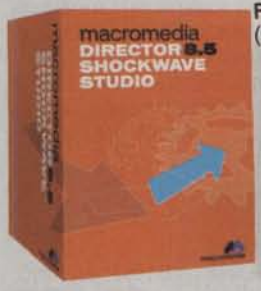
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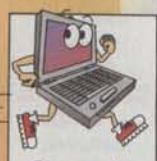
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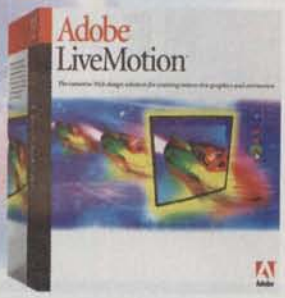
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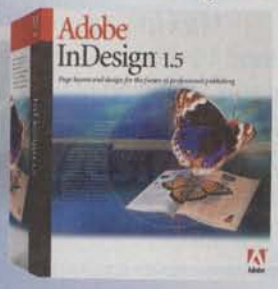


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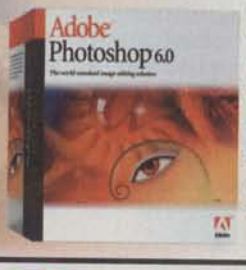


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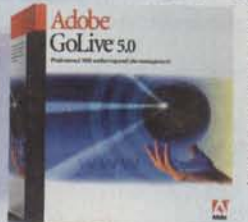


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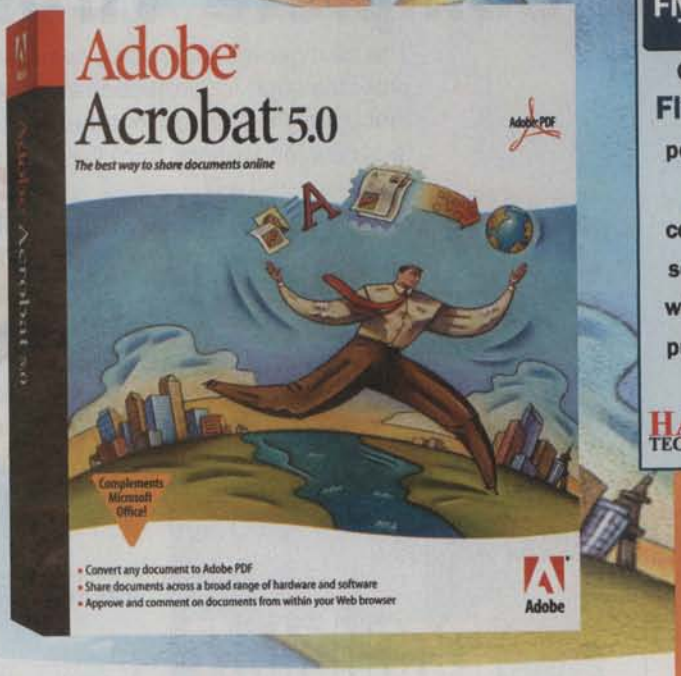
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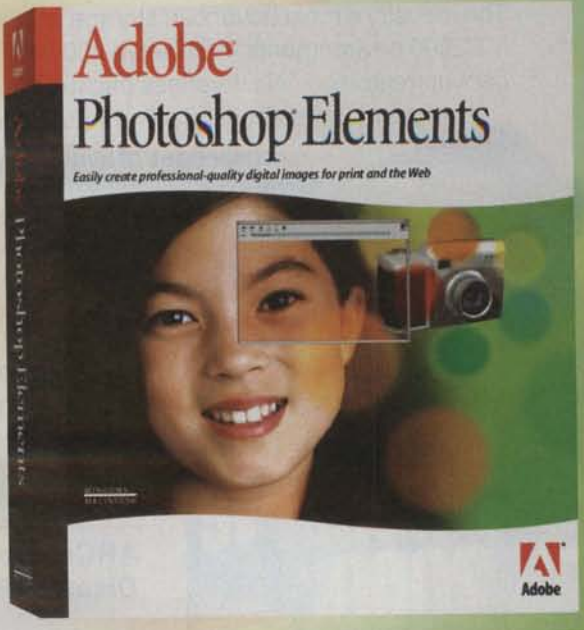
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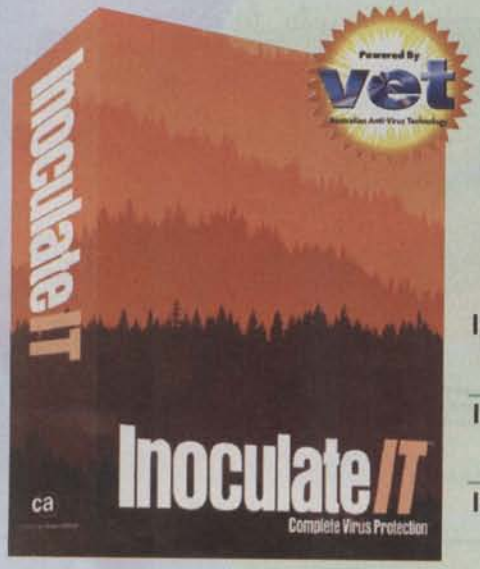
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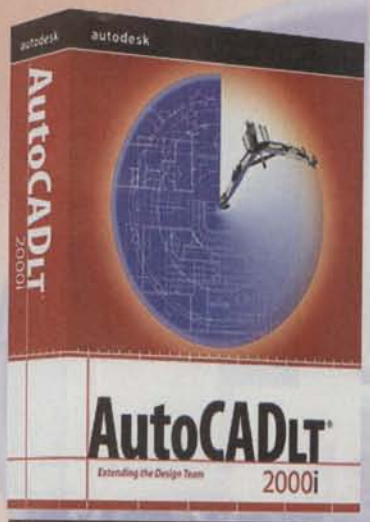
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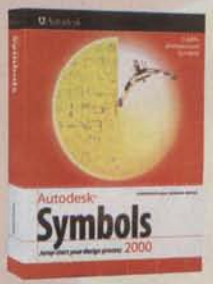
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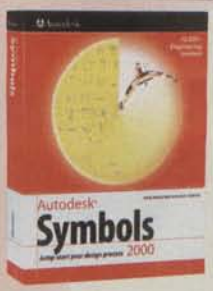
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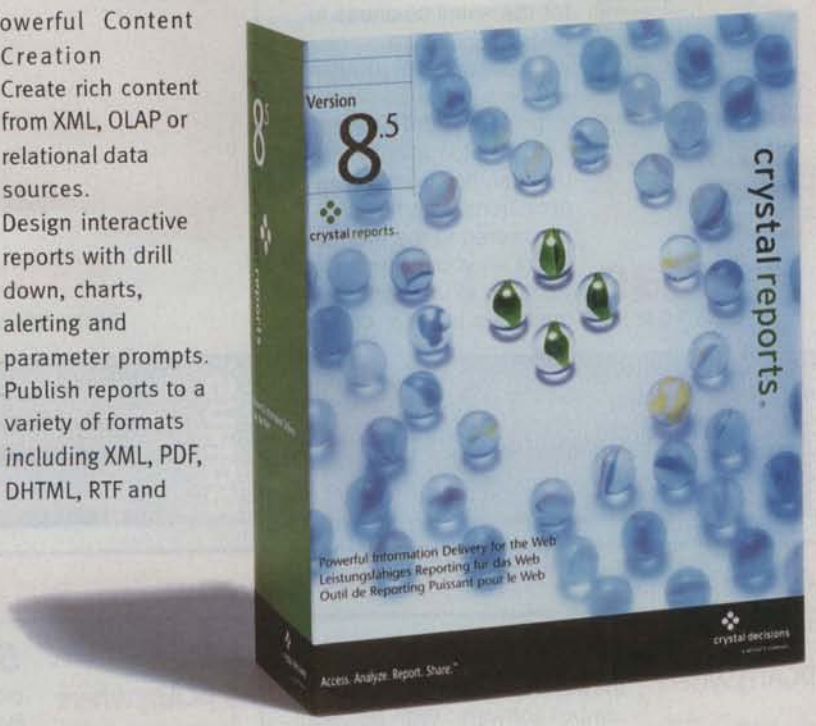
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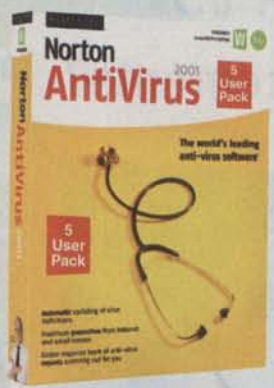
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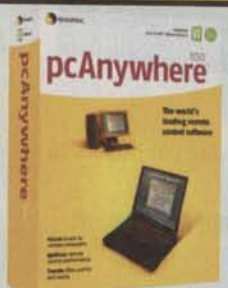
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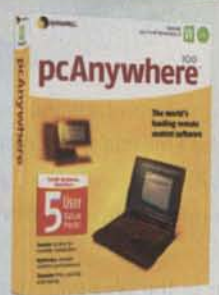


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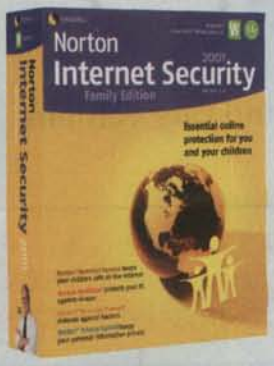
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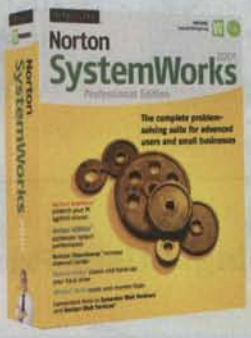


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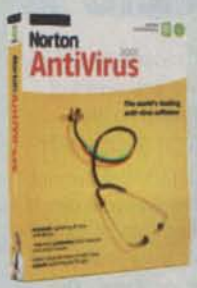
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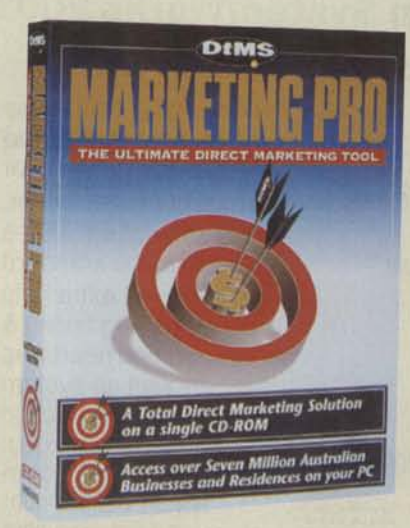
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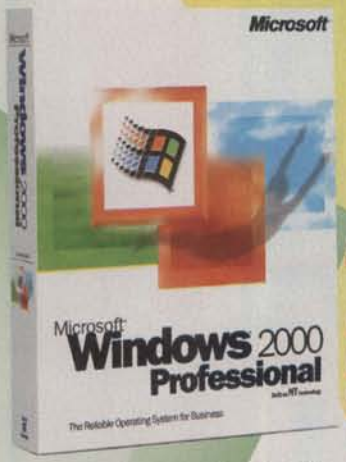
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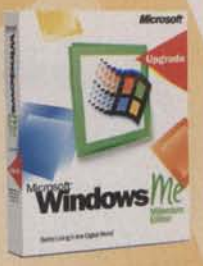
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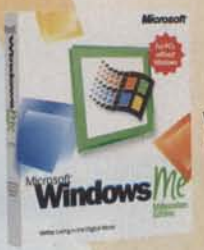
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3CDs What's hot on *APC* June CDs

Quicken Deluxe 7.5 complete version, as sold for $99.95



Quicken software is designed to make it easy to manage your financial affairs.

As an exclusive for readers of *APC*, we are pleased to offer the full working version of Quicken Deluxe 7.5 — as sold for $99.95!

In addition, a special offer is available for *APC* readers to upgrade to the latest versions: Quicken Personal Plus Version 8 and Quicken CashBook Version 8. See CD 1 for details and terms and conditions.

Hats off to Red Hat 7.1 — the hottest and latest release hits the streets

Red Hat 7.1 consists of two CDs, which include all the software you need to set your PC up as a basic workstation or as a powerful network server with more stability. Included with this release is KDE 2.1.1, Kernel 2.4.2, XFree86 4.0.3, Gnome 1.2, Red Hat Network, and more.

On CD 3 (the second installation CD of Red Hat 7.1), we have also included the latest documentation, manuals and other useful extras to get you up and running in no time.

IMPORTANT NOTE . . . Please read

APC does NOT have the capability to take support calls for Red Hat 7.1 included on the cover CDs.

If you do not feel confident in your ability to install and uninstall a new operating system, we recommend you do not install the products off these cover CDs. Instead, you should go out and buy commercial versions of the products, which comes with support options. These distributors will not provide support for products on our cover CD. Alternatively, you can get paid support from various parties.

It is essential that you back up all your important files before installing a new operating system. *APC* takes no responsibility for loss of data or other files as a result of installing Red Hat 7.1



IN SHORT, YOU TAKE YOUR PC INTO YOUR OWN HANDS WHEN YOU INSTALL AN OPERATING SYSTEM FROM OUR COVER CD. IF YOU THINK THAT YOU MIGHT NOT BE ABLE TO RECOVER YOUR SYSTEM, DON'T INSTALL THE OS.

Installation and help

Please refer to the README files in the installation of Red Hat 7.1. On CD 3, you will find the latest release of the official manuals from Red Hat 7.1 and a complete reference that covers installing and configuring. *APC* has not provided additional installation instructions for Red Hat 7.1.

Getting help

APC cannot help you, but there are organisations that can — sometimes for a price. The local distributors of the operating systems will not support this product free of charge.

There are a number of support organisations. They can be found in the phone book or on the Web with a quick search. Newsgroups are also a good place to ask specific questions about the OS. See CD 3 for a list of recommended Web sites.

Obtaining source for Red Hat 7.1

SRPMS:

If you want to get a hold of the complete source for Red Hat 7.1, the best place to directly download the source is: ftp://mirror.aarnet.edu.au/pub/linux/redhat/releases/redhat-7.1/SRPMS

Or you can send a cheque or money order for $10 to *Australian Personal Computer* and we will post you out a source CD. Mail to: Australian Personal Computer magazine, PO Box 4088, Sydney NSW 1028.

Microsoft Office XP tour



See Office XP come to life in this interactive demo, featured on CD 1. Discover how new features such as smart tags simplify productivity, enable effective collaboration, and take Office beyond the desktop.

After Hours

On CD 1 you can find the latest strategy game, Fate of The Dragon. Also, be sure to check out this month's videoclip and selected MP3s.



APC June CD contents

CD 1

Features

Quicken Deluxe 7.5
Microsoft Office XP interactive tour

Workshop

Windows: AcsSoft Photo Album 4.2, ControlCenter 1.5, DART CD-Recorder 4.0.33, Flying Popcorn 2001, FTP Voyager 8.0, NetSuperSonic 2.0, B6 Runtime files, PicaView 2.0, Pretty Good Solitaire Quest Edition 7.0, Program Lock Pro, Talisman 1.75, Window Washer 3.5, WinRAR 2.8

Linux: AlsaPlayer, Astaro Security Linux, CommuniGate Pro 3.3, Ethereal 0.8.16, Guarddog 0.95, IRCNet IRCD, KDE Studio 2.0, McAfee VirusScan for Linux, Monmotha's IPTables Firewall, Netatalk, PySol 4.6, Quake III Arena 1.27G beta patch, Vacation 1.2.5

PDAs: abcDB Database, BananaPC, Beatnik, Dashboard, Dragon Bane, eWallet, GigaBar, GoBar, Knight Move, Megalauncher II, PacMan, Palm Application Launcher, Palm Audio Player, Shadow Plan, SilverScreen, Skin Me, Slay for Windows CE, StarTap

Mac OS: AutoCat 2.9.1, CopyPaste 4.4.2, Download Deputy 4.2.2, HTML-OptimizerPlus 2.1, Iconizer Pro 1.3.8, NotePad Deluxe 2.1.1, On Air 2.1, Outlook Email Archive 2.0, Entourage Email Archive 1.3, Snitch 2.6.6, Web Devil 5.3.1

OS/2: Mixomat 2.0, File Browser 1.00b15, CleanINI 0.54b

Code: The code section for this month's workshop includes files for Insite, Mac OS, Java and C++.

First Take

GeForce3 Benchmarking Results

Patch Panel

Adobe Acrobat 4.05 Update 1, Adobe Acrobat 4.05 Update 2, Adobe FrameViewer Security Code Patch, Adobe GoLive 5.0 WML Module, Adobe Illustrator 9.0.1 to 9.0.2 Update, Win4Lin 1.0 Update 4, Win4Lin 2.0.2 Update

Random Notes

Dutch Tilders: 'Bad Books' videoclip
FasH: 'Dismay', 'Foetus Style', 'Quartize', 'This Old Mantis', 'The Tri-way Shopping Trolley'
Peregrine: 'Lost and Found', 'Deep Creek', 'On Every Page'



GameZone

Fate of The Dragon, Fate of The Dragon 1.03 patch

Browsers

Netscape 6.01

Toolkit

Adobe Acrobat Reader 5.0, Aladdin StuffIt 5.5, Aladdin StuffIt Expander 6, Downloader for X 1.23, Eudora 5.1, GoZilla Free 3.93, ICQ 2000b 4.63 Build 3281, IglooFTP PRO 1.0.2, Interarchy 4.0, LinZip 1.1, mIRC 5.82, RealPlayer 8.0, smIRCle 1.0.1a23, WinZip 8.0, WS_FTP LE 5.08

CD 2

Linux Red Hat 7.1 installation CD 1

CD 3

Linux Red Hat 7.1 installation CD 2

Linux extras

The Linux Documentation Project, Red Hat documentation, Jargon File 4.2.3, Red Hat 7.1 Updates, links and information.

Your guide to the cover CDs

The *APC* cover CDs complement the magazine and **apcmag.com**. Each month's disc collection features software related to articles in that issue, as well as special CD-only features and Web browsers.



Each piece of software includes instructions on whether you need to unzip the file before installing it, and most also include README files.

The CDs were created in HTML. You do not need any special software to access them other than a standard browser.

All software on the CDs is provided as is, without any warranty, expressed or implied. Complete terms and conditions are included on the CD; click on the Conditions of Use link for details.

How to run the CDs

Before using the CDs, please read the Conditions of Use online at **apcmag.com** under CDs. These CDs use an Autorun feature for Windows 95, 98 and NT systems. Just insert a cover CD and your browser will automatically load with the *APC* CD front page. Users of other platforms can launch their favourite browser and load the file DEFAULT.HTM in the root directory of the CD.

You should carefully read the licensing agreements and honour any evaluation or shareware terms specified, read all instructions and README files, and virus check every program before use.

APC has taken every care to ensure that the software provided is useful and that it works, but we cannot accept responsibility or liability for any of the products included. If you have any problems, refer to the Help section on the back of the CD insert.

Rule the world as a god with the help of your very own creature.

Animal house

Black & White

Peter Molyneux has long been heralded as a genius for his ability to create unique and addictive computer games. After hits such as Populous, Syndicate, Theme Park and Dungeon Keeper, the hopes for his new game, Black & White, were incredibly high. It was announced almost three years ago and, after numerous delays, it's finally arrived. Could the final version live up to our expectations?

Describing Black & White as a whole is tricky. Take a dab of Populous, add some Civilization and Settlers, and you're getting close. Add a virtual Tamagotchi and have all these elements interact. Sounds simple? It's not.

Black & White begins with a very long tutorial session that should make most aspects of the game clear. This can be annoying on replay, but *it's vital that* you listen to everything that is said. It only really gets into the game on the second level — a good three hours of gameplay away.

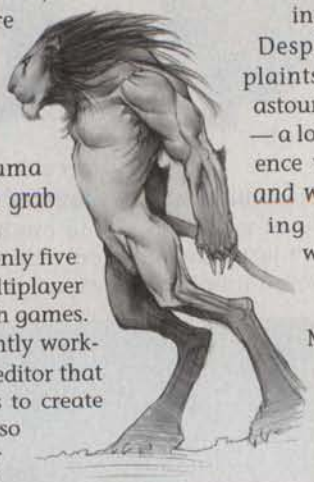


The game mechanics borrow heavily from the Populous series. You're a god, battling rival gods for supremacy across a series of different worlds. Your ability to manipulate this world and achieve ultimate victory depends on your followers. You can convince a local village to worship you by impressing its inhabitants. More followers means a larger array of spells and more energy to cast them.

One of the features that Lionhead Studios is promoting is the inclusion of your own godly creature. Initially, it seems little more than a virtual pet — a fun distraction, but not much more. The trick with your creature is that it learns from example, persuasion and punishment. Stick it in front of the village store and it'll learn how to harvest wood. Catch it eating villagers and you can slap it around to teach it not to do so in future. You can use your creature to fulfil your followers' wishes while you work on conquering more territory on each level's island.



Black & White looks great. Even on an inferior system, your creature is cute and believable. By contrast, your villagers are reasonably low resolution and blocky, which lessens the emotional trauma when you need to grab villager bodies for sacrificial rites.



The single player game has only five levels, but there are several multiplayer maps and skirmish games. Lionhead is currently working on a mission editor that will allow players to create their own levels, so the multiplayer elements should be a lot more exciting when it's released.



Black & White is addictive — very addictive. The only reason there's a magazine surrounding this review is because *APC*'s staff selflessly went cold turkey for the greater good. You need to dedicate a *lot* of time to Black & White, but the immersion level is almost unparalleled.

On the downside, there's no multiple unit/item select, a feature which would have been incredibly handy. The pace quickly jumps from slow and reflective to incredibly detailed and specific. This can leave you with too much to do, given the interface drawbacks at certain times. Loading or saving on later levels can take up to a minute on slower machines, and the method used to construct buildings can be annoying.

Despite these minor complaints, Black & White is an astounding game. *APC* likes it — a lot. It's an amazing experience to nurture your creature and watch it grow. Just learning different things and watching all the amazing outcomes of your actions can be mind boggling. Maybe if we're good, the editor will allow us to play it again.

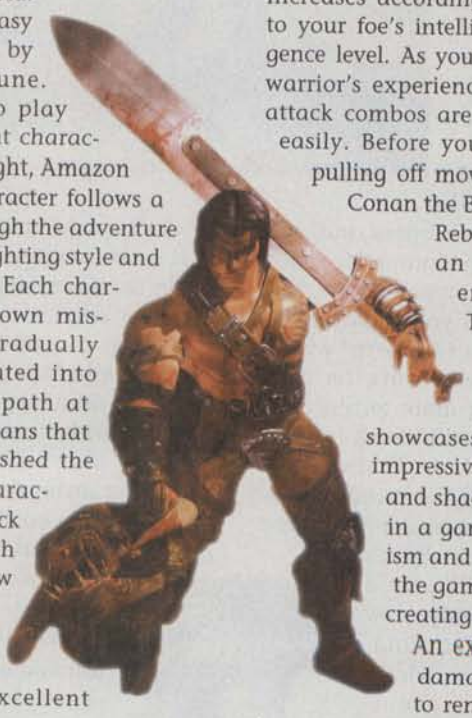
Alex Kidman and Daniel Gardiner

Contact Electronic Arts
Phone (02) 9955 7744
Online blackandwhite.ea.com
Price $89.95
Requires Pentium II 350, Windows 95, 64M RAM
Classification M(15+)
Rating ■■■■■■■■■■

Severance: Blade of Darkness

Severance is the new game from publishing house Codemasters, a company known for releasing good quality titles. This game was developed by the Spanish-based Rebel Act Studios and it caused quite a stir in gaming circles when the first screenshots were revealed. It was visually stunning and promised to be an astonishing game. Rebel Act boasted that it had developed a truly unique title, with more adventure and heroism than ever. The question was whether it would live up to the hype.

Severance is best described as a third-person, role-playing, hack 'n' slash fantasy epic, set in a typical 'Middle Ages with monsters' world. It is similar to fantasy games such as Die by the Sword and Rune. You can choose to play one of four different characters: barbarian, knight, Amazon or dwarf. Each character follows a different path through the adventure and has a unique fighting style and preferred weapons. Each character begins their own mission, which gradually becomes incorporated into the generic game path at later levels. This means that once you have finished the game with one character, you can go back and play with another to see how much the storyline differs from your original choice. This makes for excellent replay value.



The combat system can be quite tricky and takes some getting used to. This is not a game where you can just jump in and instantly execute mind-numbing fatalities; it takes time and practice. Once you have mastered the controls, distinctive weapon combinations begin to flow freely. The first few levels are quite easy, allowing you to hone your skills to perfection.



Character development is handled well. As each enemy is defeated, your experience level increases according to your foe's intelligence level. As your warrior's experience level rises, deadly attack combos are accomplished more easily. Before you know it, you'll be pulling off moves that would make Conan the Barbarian jealous.



Rebel Act has developed an astounding 3D engine for this title. The unique and detailed environments are jaw dropping. The game showcases some of the most impressive real time lighting and shadowing yet produced in a game. Focused on realism and the physics of battle, the game does a great job of creating a believable world. An exceptionally detailed damage model allows you to render your foe useless by cutting all their limbs off, and throat slashing, leg chopping and head cleaving are all endemic in Severance. The only disadvantage in the game's 3D engine is its quirky camera angles. These can be frustrating, and frequent clipping can occur if you pass too close to some objects.

Enemy AI is very well set out; hordes of different types of monsters are determined to cut you up into unrecognisable pieces. There are 35 different enemies, all with their own attack patterns and behaviour. *APC* staffers were quite surprised at the level of gore and violence in this game; it has to be one of the most bloodthirsty titles ever. The blood and mutilations can be turned off, but be warned, this game is not one for the children.

Fans of action games and RPGs should take an instant liking to this title. It makes great use of melee weapons, superior detailed environments and intriguing puzzles that keep you coming back for more. Severance is highly recommended.

Ryan Shaw



Contact OziSoft
Phone (02) 8303 6800
Online www.rebelact.net/darkness
Price $79.95
Requires Pentium II 400MHz, Windows 95, 64M RAM
Classification M(15+)
Rating

Crime Cities

Sci-fi fans are very familiar with images of flying cars speeding through futuristic cities, thanks to movies such as *Blade Runner*. Crime Cities cashes in on this concept, incorporates combat akin to that in Descent, and adds trading abilities similar to those in the classic space sim Elite. However, despite all these great elements, the developers have created a totally unenjoyable mess.

The game starts off with promise, and the ability to explore sprawling cities at any altitude is an enthralling experience. However, the novelty soon wears off when you realise that all the cities are almost identical. The surrounding environment is usually so dark that you can't tell the difference between the ground and the sky, often leaving you incredibly disoriented. Despite the numerous detail options provided, the graphics are also substandard. Buildings and cars lack definition and variety, and the explosions and weapon effects are more suited to a game from the mid-1990s.



Poor explosions and graphics could be forgiven if the combat was enjoyable, but this aspect of Crime Cities is the most frustrating of all. Unrealistic physics and over-sensitive handling plague the game, and sporadic and uncontrollable spins often result. Even the keenest gamer will find it hard to deal with the unbearable 'collision detection system'. Any movement within 5m of an object is registered as a head-on crash, ruining any chance of performing manoeuvres that are even remotely precise.



There are few elements worthy of praise in Crime Cities, but the developers have made a brave attempt to combine three brilliant concepts into what could have been an exciting new genre. Sadly, the game's poor graphics, physics and handling make it impossible for *APC* to recommend it to anyone.

Alan Crawford

Contact OziSoft
Phone (02) 8303 6800
Online www.eon-digital.com/crimecities
Price $49.95
Requires Pentium 200, Windows 95, Windows 2000, 32M RAM
Classification M(15+)
Rating ▮▮▮▮▯▯▯▯▯▯

Star Wars: Battle for Naboo

After the 1999 release of the much-hyped *Star Wars: Episode 1 — The Phantom Menace*, LucasArts has bombarded PC and console owners with a swag of games based on the movie. These titles have come and gone without any great standouts, and LucasArts can't afford more disappointments if it wants gamers' respect.

In this latest game, you play the role of Lieutenant Gavyn Sykes, a member of the Royal Security Forces based on the planet Naboo. It is your mission to annihilate the Trade Federation occupying your planet, but it's really just an excuse to blow up everything in sight.



The game was developed by the same team responsible for Rogue Squadron (another Star Wars flight sim on N64), and there are many similarities between the two titles. Essentially, both use the same graphics engine and control unit. *APC* staffers were interested to see how this title performed against the console version, particularly when it came to graphics and controls.

The game has over 15 levels, and you the can control half a dozen different types of craft featured in the movie. These range from Naboo bombers to star fighters and police cruisers. Handling the spacecraft can be touchy and often unresponsive. Enemy AI isn't all that impressive; much of their movement seems to follow predictable scripted patterns. The graphics in Naboo are also rather average, and little effort has been made to bring the textures and landscapes to life.

In short, Battle for Naboo could have been a lot better. Its average level design, poor replayability and scrappy sound leave plenty of room for improvement. It's further evidence that LucasArts is hell-



bent on milking the Star Wars franchise for all it's worth.

Ryan Shaw

Contact Electronic Arts
Phone (02) 9955 7744
Online www.lucasarts.com/products/naboo
Price $89.95
Requires Pentium II 233, Windows 95, Windows 2000, 64M RAM
Classification G(8+)
Rating ▮▮▮▮▮▯▯▯▯▯

Icewind Dale: Heart of Winter

If you're like some of the staff at *APC*, you'll admit to having played Advanced Dungeons & Dragons (AD&D). Either that or you'll lie about it. For those not in denial, Interplay's latest foray into the world of AD&D is an expansion pack for last year's stunning Icewind Dale. Heart of Winter adds another fine title to Interplay's already overflowing portfolio.

Set just after the events of Icewind Dale, Heart of Winter plunges you back into the cold dark realm of frost giants, trolls and evildoers, with some great extras. There are over 100 new items and 59 new spells to keep AD&D fanatics happy.



Unlike Icewind Dale, the plot is written in a mature way, in keeping with the darker atmosphere. The basic story has you battling barbarian hordes as you try to save the Ten Towns. Another major difference from its predecessor is that Heart of Winter is amazingly hard. It's almost guaranteed that the first barbarian you encounter will cut you apart, as will all his friends.

Players should not fret, as Heart of Winter allows you to select from multiple difficulty settings. The choice is basically between 'hard' and 'harder', but diehard players who've already finished Icewind Dale will probably appreciate this. Heart of Winter also allows you to import your character from the original game and rise to incredibly high experience levels.

The sound is about on a par with the original, but more of the characters you meet speak their lines rather than forcing you to read endless options in dialogue.



Heart of Winter isn't so much a new game as a great addition to an already fantastic series. If you enjoyed Interplay's previous RPGs and crave more, rush out and buy Heart of Winter.

Troy Deacon

Contact Interplay
Phone (02) 9959 1074
Online www.interplay.com/icewind
Price $32.95
Requires Pentium II 233, Windows 95, 32M RAM
Classification M(15+)
Rating ▮▮▮▮▮▮▮▮▮▮

Star Trek: Away Team

The Star Trek franchise has always produced a lot of computer games: some good, many of them bad. Away Team is the second from Activision. Its previous release, Star Trek Voyager: Elite Force, melded the popular sci-fi series with a first person shooter, producing some pleasing results.

Away Team is played from a third person, isometric viewpoint and divided into a series of missions. You create a squad of team members by selecting from your elite crew, each of whom has different skills and talents. In a typical mission, you blast away at enemies of all types, from Klingons to Romulans and even Starfleet officers, as you move around the map to complete the set objectives. It's rather simplistic most of the time, but it's still entertaining.



Some of the most annoying aspects of Away Team could have been easily fixed by the developers. Your team's artificial intelligence is one example. If they are fired upon during a mission, they don't automatically respond to being hit; they just stand around taking damage. During the game, you are also contacted by superiors or other team members who tell you about new developments and objectives. During these communications, the action is paused so you can read the text. Unfortunately, these often occur at incredibly inopportune times, such as in the middle of a fire fight, and the bad timing can seriously detract from the gameplay. A lot of the missions are also incredibly short, and can take under 15 minutes to complete.

Away Team is an OK title, but it has few distinguishing features. Fans of *Star Trek* and squad-based titles might extract some joy from it, but it's not quite up to the standard of Elite Force.



Daniel Gardiner

Contact Activision
Phone (02) 9869 0955
Online www.stawayteam.com
Price $79.95
Requires Pentium II 266, Windows 95, 64M RAM
Classification G(8+)
Rating ▮▮▮▮▮▮▮▮▮▮

Starfleet Command 2: Empires at War

This is the game of choice for Trekkies who yearn to explore strange new worlds, seek out new life and civilisations, and blow them to bits with photon torpedoes. Starfleet Command 2 is a space combat simulator that plants you in the captain's chair of a starship. Forget your joystick and hair-trigger reflexes; the combat is stately rather than frenetic, beautifully simulating the kind of majestic dance you'd expect when large starships go toe-to-toe.

For fans of the original Starfleet Command (or Starfleet Battles, the board game on which the PC games are based), Starfleet Command 2 is an obvious buy. There are a few more races to explore and the graphics engine has been revamped. The core gameplay remains the same and those who enjoy a good tactical duel will be very satisfied. The vessels you can captain depend on the campaigns you choose and include Federation frigates, Romulan Birds of Prey and Klingon battle cruisers.

There are eight race groups and each of their ships has strengths and weaknesses. Klingon ships are fast and manoeuvrable,



but they lack powerful weapons and strong shields. In contrast, the ships of the Interstellar Concordium (one of the new races) are slow and cumbersome, but they can atomise an enemy in a few short salvos. Your choice depends on the style of combat you prefer — developer Taldren has done an excellent job of balancing the gameplay to make sure that no one race is dominant. This is very important in multiplayer games and ensures excellent replay value.

Before each mission, you are presented with a standard hex map covering the local galactic sector. This is where you repair or upgrade your ship, take on supplies and check the latest campaign news. This is also where you accept your missions. Unfortunately, the campaign information is poorly presented and it is difficult to work out how important each mission is or how much impact you are having on the overall campaign universe.



However, the missions are where the main action is, and there is little here to criticise. Battles take place in full graphical splendour, with detailed 3D ship models, spectacular planets and nebulae, and impressive weapons and lighting effects. The range of available combat methods is impressive. Primary weapons include phasers and torpedoes — photon or plasma, depending on your race. You can drop mines to foil a pursuer, or place them in front of an approaching enemy. You can capture an opponent's ship in your tractor beam and pummel it with phasers at a leisurely pace. You can even beam marines aboard an enemy's ship and order them to disable key systems. This kind of complexity gives the game enormous replay value and ensures that there is a combat style for everyone. It also means that the ships take some effort to master. There are a small number of useful but rudimentary tutorials available (voice-overs provided by Captain Sulu), as well as a thick manual that is required reading.

Multiplayer is available and highly recommended. The AI of the single player game is good (and much better than the original), but it's still no match for the challenges provided by a strong human opponent. Unfortunately, the much-touted persistent online universe that was promised has not yet eventuated. The game also has a host of serious bugs, most of which have been fixed by subsequent patches. These problems aside, Starfleet Command 2 is a terrific game and one that will satisfy tacticians and Trekkies alike.

Jon Gill

Contact Interplay
Online www.interplay.com/sfcommand/sfc2
Price $87.95
Requires Pentium 233, Windows 95, 64M RAM
Classification G(8+)
Rating ■■■■■■■■■□

Gamespy

● The release of Nintendo's much-touted next generation console, the GameCube, has been delayed. Originally scheduled for a July release in Japan, representatives have announced it will not appear until September. What this means for the US and European release dates is unclear (they were scheduled for October 2001 and early 2002 respectively). The Australian release often mirrors the European one, so the machine's local release could be as far away as mid-2002. Rumours are also flying as to whether or not the GameCube will be released at all. Recent comments from Nintendo President Hiroshi Yamauchi suggest that if the machine does not receive an overwhelmingly positive response at E3, it might not be produced at all. You'll have to wait and see whether this is a PR stunt or not.



● A class action against 25 media companies, based on the Columbine shootings, has been filed in the US. The $US5 billion suit is an attempt to make the videogame industry more serious about imposing age restrictions on game purchases. The aim is to keep violent videogames out of reach of people under the age of 17. Nintendo is among the companies named in the suit

● Swedish mobile phone game developer, It's Alive, has an interesting service available for GSM mobile phone owners. It's currently possible to pinpoint your phone's position using a number of different techniques, even if you don't have a GPS-enabled device. It's Alive has cashed in on this technique by developing a game called BotFighters. Players duke it out by checking their opponent's position using an SMS, and then 'firing' another SMS message at them once they come within a certain range. Players can also upgrade their robot and weapons. Unfortunately, the game is only available in Sweden. Here's hoping it's a hit so we see a local version. Check out www.itsalive.com for more information.





Want to build your own arcade?

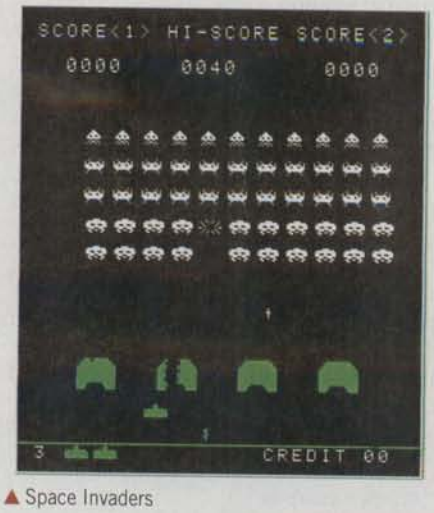
Despite increasing competition from home consoles and emulators, there's still a thriving market for arcade gaming machines. ***Angus Kidman*** *hits the auction trail and tries to pick up a bargain.*

On a cloudy Sunday morning in late March, about 300 people gathered at Sega World, the arcade and amusement park on the shores of Sydney's Darling Harbour. This was the largest gathering Sega World had seen since the previous November, when it closed its doors for the last time. However, this crowd hadn't gathered to play the many arcade machines inside the centre; they'd come to buy them.

In the largest sale of its type ever seen in Australia, industrial auctioneer Gray Eisdell Timms sold off the entire contents of Sega World, an $80 million development that opened in 1996 but was never able to attract the 800,000 visitors per year needed to make it profitable. In a stark demonstration of the loss its investors faced, only $1 million was expected to be raised from the sale.

It was thought that most of these funds would come from the the sale of the major attractions in the centre, but few sold for as much as anticipated. The top-priced item on the day, the roller-coaster attraction Rail Chase, sold to an overseas buyer for $140,000 — well below the $200,000 the auctioneer asked as a starting bid. The same buyer picked up the Visionarium interactive cinema for $50,000 and the VR1 ride for $27,500. Other major sales were the Magic Motion cinema for $95,000 and the Ghost Hunter ride for $50,000. Bids for the Aqua Nova VR ride failed to reach reserve, and the equipment was sold off piecemeal.

The large rides and much of the operational equipment were sold to professional arcade operators, but the 70 arcade machines, 60 game boards and assorted game cabinets mainly attracted attention from individuals looking for machines for their homes. The first seven hours of the auction were a marathon — everything from filing cabinets to gigantic chemistry sets went. It was clear that most onlookers did not come for these items, but in the hope of picking up an arcade machine to take home. "How much do you think Daytona will go for?" one anxious-looking father was overheard asking before the auction began.



▲ Space Invaders

Fierce bidding

The answer to that question turned out to be $4,700. Prices like this disappointed bidders who had dreamed of picking up a really good deal, but they were still substantially lower than the cost of a new machine (about $30,000). As family bidders quickly dropped out, competition intensified between arcade owners and electronics enthusiasts — with some surprising results.

Racing games, complete with steering wheels and other equipment, were popular. At $6,500, Sega Rally 2 sold for more than Daytona. Bidding was also strong for the Alpine Racer skiing game, which eventually sold for $2,250. Even Aggro's Fantastic Video Game, a machine starring the character from the now-defunct children's television show, attracted $1,500. This price was typical of many of the machines aimed at younger visitors.

Arguably, the bargain of the day was the R360 Wing War Simulator, a spherical VR ride that Sega World had picked up for a reputed $100,000. It sold for just $7,500. The cost of removing and shipping the delicate equipment could effectively double the price, but the savings for prospective arcade operators were still substantial.

Some of the lesser-known and less high-tech arcade titles failed to attract high bids.

Sega Virtua Cop 2 sold for just $350, and Decathlete went for $400. Less well-equipped driving games also failed to draw big numbers. Winning Run sold for $450, and Gaelco World Rally for $400.

Perhaps the most surprising price of the day was the $1,000 paid for a vintage Space Invaders machine, complete with original decals and showing signs of wear on its metal slide control. It was probably the oldest piece of equipment in the building, so many thought it would go for a song. However, its final price was well above what was paid for more recent titles.

The $1,000 price tag was no doubt partly the result of Space Invaders's iconic place in the arcade pantheon. However, just being well known was no guarantee of fetching a high price; a fully operational Mortal Kombat game sold for just $400.

Many items went for much less than expected, but some bidders succumbed to auction fever and paid excessive prices. For instance, a well-worn Dreamcast console sold for $175 — only fractionally less than a new one.

Build it yourself



Games enthusiasts looking for a bargain had their best chance when the auctioneers turned to the individual games boards. Getting the boards to function requires a good understanding of electronics, but as they're considerably cheaper than complete systems, many judged the extra effort worthwhile.

Bidders couldn't bid for single boards. Grays needed to dispose of lots of identical items, so they were sold in bundles from four to 15. Prices for bundles of six boards ranged from $50 to $100, so most bidders were likely to be satisfied.

However, it was clear that some games were more attractive than others. A bundle that included Tekken sold for $275, and an otherwise unappealling four-game package that happened to include a World Wrestling Federation title went for $80. Having purchased a bunch of boards, bidders then needed cabinets to put them in. (For other alternatives for building arcade systems, see 'A more versatile arcade'.) Bidding on cabinets was competitive, with prices ranging from $200 to $650.

The top-priced games

R360 Wing Wall Simulator	$7,500
Sega Rally 2	$6,500
Sega Daytona USA	$4,700
Namco Alpine Racer	$2,250
Sega Wave Runner	$2,000
Space Invaders	$1,000

Source: Sega World auction, March 25, 2001



▲ Sega World at Sydney's Darling Harbour

Going online



The Sega World sell-off provided an unusual opportunity for Australian gaming enthusiasts to participate in a sale of arcade machines not conducted online. Arcade enthusiasts usually pursue their obsession through online auction sites, where games and equipment regularly change hands for large sums. These auctions provide a new market for old arcade systems, and also encourage a culture centred on arcade gaming. This has seen the creation of arcade emulators such as MAME (see *APC* May, page 119), and businesses that specialise in repairing older systems.

However, buying machines through online auction in Australia can be difficult, as the small population means there are relatively few second-hand machines for sale. For instance, eBay (which dominates the market for arcade game auctions) has a specific Collectibles:Coin-Operated: Arcade category in its US listings, but in Australia only a Collectibles:Coin-Operated:General category. This is because the Australian site often has only one or two games on sale at any one time. The US parent site usually lists dozens, as well as with ephemera such as game manuals and decorative stickers.

Many of the larger US sellers are happy to ship to Australia, but the cost is considerable. Many charge between $US60 and $US100 just to 'crate' the machine, and shipping costs start at $US500. Other obstacles include the weak Australian dollar and the need to adapt the power supplies to suit local voltage and current. With all these problems to consider, you have to be highly motivated to import a system.

The chances of scoring a bargain-priced arcade machine on eBay have faded as sellers have become more aware of the market. Many arcade systems now have reserve prices from $US500, which makes the prices paid by bidders at the Sega World auction look extremely reasonable.

A more versatile arcade

An obvious disadvantage of having a dedicated arcade machine in your house is that, if it's left as originally configured, you can only play one game. Compared to the limitless gaming potential of a PC or console, this is a little restrictive. However, as more home users begin to buy arcade systems, several possible solutions to the dilemma have emerged.

Many arcade systems have the same basic internal infrastructure, so it's not too difficult to use more than one board in a machine. Of course, you have to get hold of the boards in the first place, but there's a brisk trade in them on eBay and other sites, and the shipping problems related to complete systems don't apply to boards.

Some online sellers even include extra games in a single package. For instance, it's not uncommon for people selling Pac-Man, Ms Pac-Man or any of the other numerous Pac derivatives to offer to 'upgrade' the system with pirate boards that allow you to play all the titles. This can lead to controller issues; if the arcade system you use only has a joystick and one button, playing Street Fighter is likely to be a little difficult.

The growth in popularity of arcade emulators such as MAME has also produced new 'arcade PC' systems that contain a standard PC in an arcade casing. These allow you to replicate the arcade experience with classic games (you can download the ROMs or purchase the PC equivalents) and newer PC titles.

Some gamers construct their own arcade systems from discarded cabinets, and a market is also emerging for these systems. For example, the US company HanaHo (www.hanaho.com) markets a range of cabinets called ArcadePC. The cabinets include a built-in monitor and authentic arcade joysticks and control buttons — you just add your own PC. These systems even have swappable control panels so you can change buttons for different games. HanaHo built the ArcadePC as a sideline to its existing business of servicing 'real' arcade machines.

As well as 'classic' arcade cabinets, HanaHo also offers a miniature version and a 'cocktail mode' tabletop system. However, with prices starting from $US999 for the smaller versions (excluding shipping) they're not particularly cheap.

Best ever real time strategy games

Deciding what is and what isn't a real time strategy game was quite a difficult task. APC used the following characteristics as a guide to selecting this bevy of RTS beauties: they must be played in real time, emphasise base building, and involve destroying your enemy.

Battlezone (Activision, 1998)



This is a difficult title to categorise, as it combines first person and RTS elements in a new type of game. The RTS elements play a crucial part in the game, and the setting — an alternate future where the Cold War is conducted in space — is compelling. It takes a little while to adjust to Battlezone's first person perspective, but once you master it, it's great fun to zoom around giving orders to your units, gathering resources and blasting enemies.

Close Combat (Microsoft/Mindscape, 1996 - 1999)



Microsoft and Mindscape's Close Combat series has often been overlooked by RTS fans, but it provides some of the best strategy war games around. The game is set in World War II, and your task is to lead your troops in a series of strategic battles. Close Combat's real time play sets it apart from almost every other World War II strategy game, and the focus on the psychological impact of battle on your troops adds a fantastic element of realism.

Age of Empires (Ensemble Studios/ Microsoft, 1996)



Age of Empires awesomely mixes historical simulation and strategy in one game. The action in Age of Empires and its sequel, Age of Kings, takes place across several time periods and civilisations. The different civilisations that players can experience range from simple hunter-gatherer societies to ancient Egypt and Rome. Both also have great expansion packs that add to the number of civilisations you can play with.

Homeworld (Relic Entertainment, 1999)



This space epic by newcomer Relic Entertainment has true 3D multi-axis movement and combat. Using the interface requires a little practice, but it makes the switch to 3D reasonably painless. The single player campaign is rather short, but the story and atmosphere are superb — quite an achievement considering Homeworld was Relic's first game. The standalone mission pack, Homeworld: Cataclysm, continues the story and great gameplay. It was developed by a different company (Barking Dog Studios), but it's as good as its predecessor.

Settlers (Blue Byte, 1994 - present)



Settlers is similar to Sid Meier's classic turn-based strategy game Civilisation, but in real time. Its setting is medieval, but quite realistic. The resource management is absolutely real time; for example, you must wait for wheat to grow, be harvested, milled and made into bread for your troops. The emphasis is on building up a defensive empire, as battle is less predictable than in many other titles. However, there's plenty to follow onscreen and there are some great spot animations.

Dune II: The Building of a Dynasty (Westwood, 1992)



Based on Frank Herbert's *Dune* series of novels, this game gave birth to the RTS genre. It combines resource collection, base and troop construction, and real time combat encounters. You can play from three sides: House Atreides (the good guys), House Harkkonen (the bad guys) or House Ordos (a mysterious, wealthy third faction). Emperor: Battle for Dune, an unoffical sequel to Dune II, should be out later this year.

Command & Conquer (Westwood Studios, 1995)



Dune II may have given birth to the RTS genre, but Command & Conquer brought it to the mainstream. Using a formula similar to its predecessor, Command & Conquer allows you to choose between fighting for good (the Global Defense Initiative) or evil (the Brotherhood of NOD). The game is set in the near future, when a mysterious mineral called tiberium starts appearing all over the earth. The game makes several improvements on Dune II. These include flashy cut scenes, a more intuitive interface and multiplayer mode. You can also select multiple units and group them, saving hours of time and bucketloads of frustration. Red Alert further expanded the series. You can choose between blasting the hell out of the Soviets or the Americans.

Dungeon Keeper (Bullfrog, 1997)



After at least one major redesign and what seemed like decades in development, Dungeon Keeper was released in 1997 by Bullfrog and Peter Molyneux. It took the traditional role-playing game model and turned it on its head, giving players the chance to be the bad guy. The concept is simple: you must expand a dungeon by tunnelling out more rooms, harvesting gold and attracting monsters. Of course, your dungeon is a magnet for all sorts of goody-two-shoes adventurers. Warriors, wizards and other 'heroes' want to break into your domain, vanquish your monsters and steal your gold. At the time, this was a fresh take on the conventional management strategy game. It is also possible to zoom in and control your monsters from a first person perspective. Way cool.

StarCraft (Blizzard, 1998)



After storming its way to the top of gaming with Warcraft and Diablo, Blizzard again took the gaming world by storm with StarCraft. At first, many players were disappointed that StarCraft was not a great technological improvement on Warcraft II. However, its unique blend of a compelling story, a cast of unforgettable characters, and solid, well-balanced gameplay soon won them over. The expansion pack, Brood War, is stunning. It continues the story where the original left off and adds new units and missions. Multiplayer is also great fun — in Korea, this component has helped sell over 1 million copies (that's about one for every 60 people).

Black & White (Lionhead Studios, 2001)



Peter Molyneux's latest god game (reviewed on page 187) combines the best of his previous epics, and piles on even more fun. Black & White has you battling gods for world dominance. Your powers are contingent on your ability to convert the native humans: the more followers you acquire, the more power you attain. You also have to choose a Creature, an oversized totem animal such as a lion, cow or monkey. Your Creature can carry out tasks when you are busy doing other things. For example, if you chain it to a village storehouse, it'll fill it with wood and food. You can also cast spells in a rather unique manner, tracing shapes with your mouse to activate them.

Would make Marc Antony proud

Sacrifice



Total Annihilation

Uprising

Shogun



Mega Io Mania

Would make Caligula proud



Star Trek: New Worlds

M.A.X. 2

Dune 2000



Z

Star Wars: Force Commander

Money, money, money

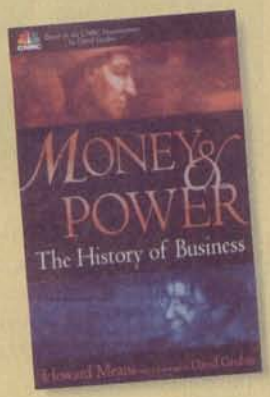
Take a look at money and power — past, present and future

Money & Power

This companion book to a CNBC documentary profiles 12 moguls who have shaped the modern world.

The book journeys through the defining changes of the last millennium, tracking the shift in money and power from the church and crown to the corporate world. It covers events that produced dramatic changes in trade, banking and commerce, and led to globalisation.

The book begins in 1065 with the birth of one of the first capitalists. Born in poverty, St Godric became a rich merchant king through a vision and determination to pursue what others believed unattainable. Even his decision to turn his back on his wealth and become a monk challenged existing paradigms.



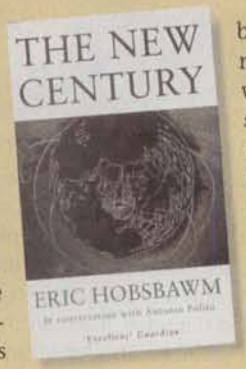
St Godric's foresight and determination can be seen in all the people profiled in this book. Coca Cola's Robert Woodruff had the vision to create the first global brand; Henry Ford dared to manufacture and sell cars cheaply enough to create mass market demand; and Bill Gates knew how to turn technological innovation into sales.

Money and Power is a fascinating read that you won't want to put down.

Cathie Kennedy

Author Howard Means and David Grubin
Publisher John Wiley & Sons
Contact Wiley
Phone (02) 9805 1100
Price $45
ISBN 047140053X
Rating ■■■■■■■■■■

The New Century



Eminent Marxist historian Eric Hobsbawm's *The New Century* reviews the closing years of the millennium and looks at the implications for the years ahead.

The themes are familiar: economic globalisation and the growing power of legal and illegal enterprises; the breakup of nations along ethnic lines; the state's loss of its monopoly on certain powers; a new willingness for states to involve themselves directly in events outside their own borders; the rise of the megarich and the growth of poverty; and the ongoing use of automation to reduce staff levels.

Hobsbawm expects technology to continue to make humankind better off, but he fears that the polarisation of wealth will continue, causing dangerous social and political stresses.

IT doesn't play a big part in this story, but Hobsbawm makes some pertinent observations: people prefer to work with other people; centres such as Silicon Valley reveal the continuing need for masses of labour; and despite having access to so much information, people living in "the favored regions" are cut off from the world inhabited by the majority.

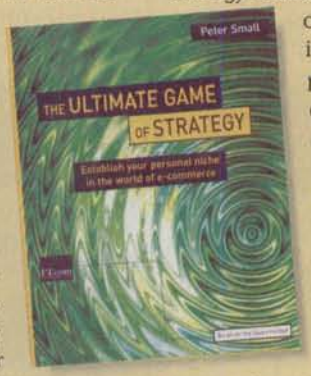
This book reminds you that an economy functions within a society, not vice versa.

Stephen Withers

Author Eric Hobsbawm
Publisher Abacus
Contact Penguin
Phone (03) 9871 2400
Price $19.95
ISBN 034911336X
Rating ■■■■■■■■■■

The Ultimate Game of Strategy

According to author Peter Small, you must be prepared to throw out conventional business methods to be successful in the world of ecommerce. Willingness to innovate must encompass everything, from management and leadership styles to business planning. As a one-time professional poker player, Small proposes that the way to survive and prosper in the eworld is to use game theory; a "conceptual framework for studying competition in environments where there are many unknowns, constant change, uncertainty and competition".



The book suggests that to establish a niche in ebusiness, you must challenge fundamental assumptions about conducting business. Success in the information age depends on the ability to establish collaboration — a process that Small believes is 99% about communication and 1% about technology.

The challenges *The Ultimate Game of Strategy* issues to conventional ways of conducting business are interesting, but they are not always convincing. Conventional practices are too readily dismissed, and in some cases a naive view is proffered to make a point.

Criticisms aside, you will find plenty of tools in this book that, when used with common sense, will help you find your niche in the ebusiness world.

Cathie Kennedy

Author Peter Small
Publisher Pearson Education
Contact Pearson
Phone (02) 9454 2319
Price $49.95
ISBN 027364999X
Rating ■■■■■■■■■■

Discover an acoustic rock band and an electronica artist who share a love of music across vastly different music styles.

Bridging the gap

Peregrine

Acoustic rock outfit Peregrine have earned a reputation for rocking Sydney's clubs and pubs, having played extensively around the city for the last two years. The band members are singer/songwriter Brett Winterford, bassist Dane Higgins, drummer Mat Smith and guitarist/percussionist Felix Akurangi. "We have always tried to keep our sound very organic and natural, using live percussion, acoustic guitars and pianos," Winterford said.

Winterford is responsible for the band's Web presence, and is enthusiastic about the Net's ability to bring fans and artists together. "I could organise a gig next week, and at the push of a button I can let hundreds of people know about it, and have a guaranteed crowd," he said. "Having MP3s available on the Web is also really valuable, and is great for feedback. When you sell a CD, you don't know how often your audience listens to it, when they listen to it, which songs they like most. You can't quantify these things purely on how loudly people cheer at a gig. All of these tools that you get from the Web mean that we, the artists, can choose to take part in the promotion of our music."



The band's previous releases include *Convenience Kings* in 1999 and *Discover* in 2000. Peregrine pay attention to their fans and supporters. Their attitude concerning their third CD release shows the gratitude they have for their fans. "We recently recorded a six-track EP (*Forty Five*) in a studio, which started off fairly raw, but then slowly became layered as my imagination got the better of me. Although we love the result, we have been discussing the option of recording a live CD, because initial feedback suggests that the recording is not representative of our live sound. So pretty soon we'll be doing a live set, drumming up some cheap artwork and manufacturing, and handing out live CDs at gigs or as supplements to those who buy the studio CD."



Forty Five will be available in June from chaosmusic.com.au, as well as directly from the band's Web site and at selected retailers.

Daniel Gardiner

Tracks Deep Creek
Lost and Found
On Every Page

Online www.peregrine.live.com.au

FasH

FasH is a Sydney-based electronica artist who plays multiple instruments. Listening to a few of his tracks, you become aware of his diverse styles and uncanny ability to juxtapose conflicting types of music. The tracks are extremely varied, ranging from harder, industrial music with low, subtle horns and the sounds of rivets being tightened, to groovier drum 'n' bass works, and even trance-derived, tribal tracks.



FasH's name is shrouded in mystery. When asked about the story behind it, his reply is simply, "That's an epic of vast proportions, which I cannot dare fit into mere words. Without delicate gestures, distinct vocal sounds, three pygmies and a tub of lard, it would be impossible. Let's just say it's my nickname and leave it at that."

His love of creating music on computer began in 1998 and he has nothing but praise for the technology. "It's made a whole style of music available that I once thought was unattainable by a guitarist — and with a side dish of wedges! With my GR-30 guitar synth, my decrepit PC and preschool knowledge of the electronica scene, I can belt out songs that, although very basic and short, are in compliance with health regulations."

Always cryptic, FasH offers this insight into where his passion for music comes from: "It began at the beginning and it's been going on to this day, for as long as I remember. I was submerged in the deep end at an early age and have been exploring the depths ever since. Just put it down to a blind love of noise and plenty of time to fool around."

FasH is currently unsigned, but he has released a large number of tracks that are available from his Web site.

Daniel Gardiner

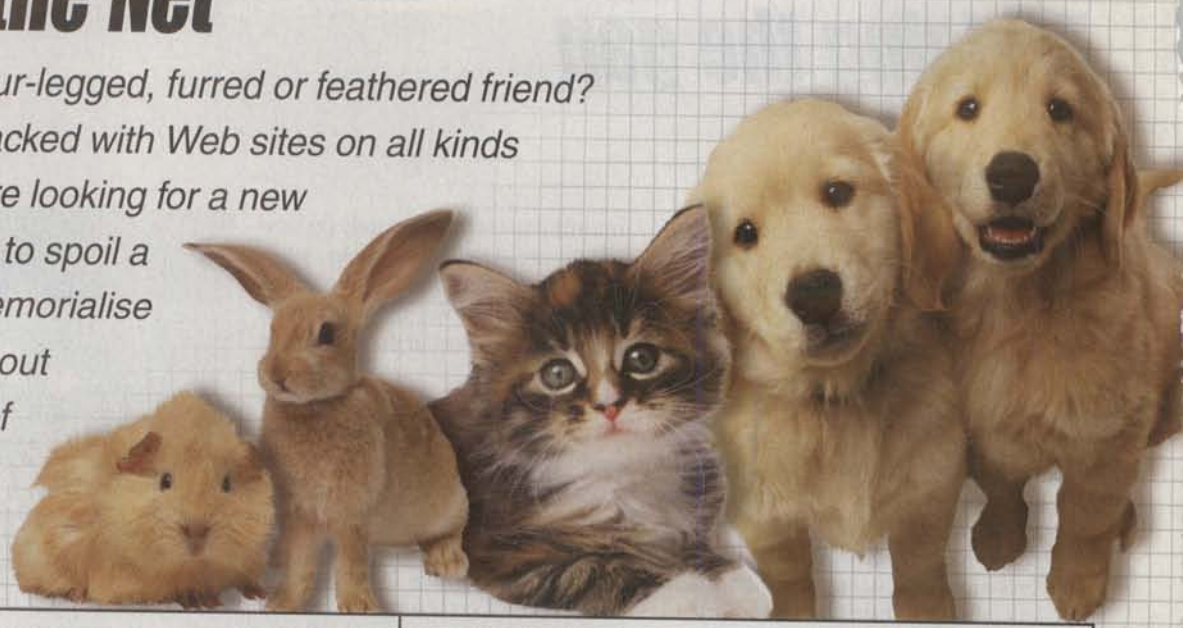
Tracks Dismay
Foetus Style
Quartize
This Old Mantis
The Tri-way Shopping Trolley

Online www.mp3.com/fash

All these tracks and the videoclip featured in Random Notes can be found on CD 1 of this month's cover CD pack, along with profiles of the artists.

Pets on the Net

Do you have a four-legged, furred or feathered friend? The Internet is packed with Web sites on all kinds of pets, so if you're looking for a new companion, want to spoil a current one or memorialise a lost one, check out APC's selection of pet-related sites.



AOL Pet Match

If you don't know which doggy (or kitty) in the window to choose, try AOL's Pet Match page. You can work your way through a question and answer guide and create a list of the dogs and cats — or pets in general — most suited to your lifestyle. You can also select two or more animals and make a side-by-side comparison of their features and needs. For example, border collies and pointers have similar attributes, but the collie is a fast learner and the pointer is rather stubborn. Once you have made your choice, there are links that allow you to delve further into the habits of your future best friend.



Online www.personalogic.com

Rating ■■■■■■■■■

Lindsay Hayman

In Memory of Pets

This is a site where people can post stories, poems and tributes to pets that have died. Predictably, the pages are covered in gushing prose and cute pictures of animals with flapping 'angel' wings. The air of sentimentality is also reflected in the contributions of the pet lovers. There are probably over a thousand pieces of writing on this Web site. It also offers a 'Candle Light Rose Ceremony' on weekends for people to remember their pets. The site provides links to other pet-related sites, such as animal hospices and vets. The repetition of the donation address is a little crass.



Online www.in-memory-of-pets.com

Rating ■■■■■■■■■

Megan Smith

Lort Smith Animal Hospital

This well-designed and very practical site is run by an animal hospital in Melbourne. The hospital's 60 staff, including 16 vets, bring their thorough knowledge and love of animals to the site. It has information on pet care and health, and links to other resources. It covers all sorts of pets — cats, dogs, ferrets, rats and rabbits to name a few — and has a section on Australian wildlife issues. There is a children's page, with games, stories and children's artwork. The hospital also shelters strays and abandoned pets, and there is a section for finding and adopting them.



Online www.lortsmith.org.au

Rating ■■■■■■■■■■

Megan Smith

Lost Dogs' Home

Victoria's Lost Dogs' Home was established in 1912 and is still going strong. Its Web site is mainly a catalogue of cute puppies and kittens looking for homes. If you are a sucker for sweet little Labrador pups and bewildered-looking Persian kittens, you'll find plenty to adore here. Aside from encouraging visitors to adopt homeless animals, the site also sells pet care books and products, pet toys and name tags. It lists the Lost Dogs' Home's other services, which include puppy preschool, and maintains news and events pages, plus animal welfare links. You can also make an online donation to the home.



Online www.lostdogs.org.au

Rating ■■■■■■■■■

Suzanne Fraser

My Pet

Winter is coming, and what better way to keep your pooch warm than with the great Aussie clobber available on this Web site? You can kit your dog out in a 'bones-r-dry' coat with a matching Kubra hat, or if you're over the whole rural look, how about a fake mink coat? My Pet insists that every well-dressed bitch will be wearing one. With a canine complexion to worry about, it's probably a good idea to pick up one of the stylish sun hats as well. You can buy dog leads and collars, but after the mink coat, they should be ashamed to describe them as accessories — there's not even a rhinestone in sight!



Online www.ozemail.com.au/~mypetshop
Rating

Gail Lipscombe

NeoPets

If you're pining for a pet but you live in a shoebox, and you've tried a Furby but it's looking a little moth eaten now, why not create a virtual pet online? NeoPets live in Neopia, a vast and varied world that you can explore in the company of your own pet creation. You need to care for your pet so it can survive and thrive, and you can meet and chat with other owners and share your experiences. The site is a little sponsor-heavy — I doubt Medor44, my green Blumaroo, will fare well if I don't sign up with at least one of the sponsors listed — but it's fun nonetheless.

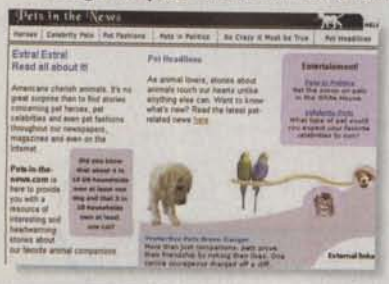


Online www.neopets.com
Rating

Lindsay Hayman

Pets in the News

A good site for children, Pets in the News is filled with stories of pet heroism, celebrity pets and even pet fashion. There's a news section that covers everything from lost kittens to the dachshund who plays the organ and sings. You can test your knowledge on pets of the rich and famous (did you know that Walt Disney had a real pet mouse called Mortimer?), or use the links provided to find other pet-related sites. The site is easy to navigate, but rather short on pictures. It's based in the US, so the vet search function is unlikely to be of much use.



Online www.pets-in-the-news.com
Rating

Suzanne Fraser

RSPCA

The RSPCA's site is graphically unimpressive, but communicates the core values of the organisation quite well. State areas can be selected from a graphic, but when *APC* tested the site, several area links were either not responding or were still being built. The site offers an impressive amount of information; it ranges from details on exactly why cats should be left in at night, to position papers on issues that concern the RSPCA such as the tail docking of dogs. The site has great content, but a pedestrian interface.



Online www.rspca.org.au
Rating

Alex Kidman

Sea-Monkey Central

Children who can't have a puppy can always depend on that classic consolation pet — the sea-monkey. Disappointingly, the official sea-monkey site offers little more than uninteresting promotional material and a brief history of sea-monkey products and memorabilia. It is difficult to navigate and does not appear to have been updated for almost a year. The site has also recently attracted criticism from sea-monkey lovers who argue that the manufacturer's latest mini-tanks fail to provide the caring home every brine shrimp deserves. Sea-monkey carers are better off visiting fan sites for more information.



Online www.sea-monkey.com
Rating

Fiona Angus

Winky's Pet Horoscopes

This wacky little Web site is a gem. Winky is billed as "the Internet's foremost feline astrologer" and, yes, Winky is a cat. Well, who better to give you a little insight into your moggy's moods and behaviour than through the stars? Winky's not just an astrologer extraordinaire; her uncanny predictions will help your pet steer a safe course through life — and the neighbourhood backyards. If your pet has a purrplexing problem, help is at hand. Winky is also a feline agony aunt, dispensing advice to clueless pet owners, accompanied by the familiar strains of 'The Age of Aquarius'.



Online www.pet-net.net/pet-horoscopes
Rating

Gail Lipscombe

A load of old balls

Here at APC, we've been the target of just about every tacky PR gimmick around — rancid tins of tuna, packages of mouse balls and even the occasional free pizza. One of the most common PR tricks has been the branded squishy ball. We love them — what other piece of industry nonsense can be ground under your heel, thrown at your workmates or used as an unconventional wrist rest? With this in mind, APC got together a bunch of squishy objects for an impromptu 'review'.

Squishy ball (various vendors)



These come in a variety of colours, but yellow seems to be the most popular. More important than the colour is the consistency of the ball: too soft and it's vaguely pervy feeling; too hard and it leaves bruises on unsuspecting *APC* staff members.

Gateway squishy cow/box



The cow was a classic, even if it did present a danger to toddlers. Rumour has it that Gateway employees came in the day they were banned to discover all their desk cows removed by the 'men in black'. The replacement object, a nondescript cube, still has edges sharp enough to endanger the eyes.

Ericsson ball on a string



An odd one, this. Take a squishy ball, give it golf-ball-like divots, then put it on an elastic band. Sounds great; you should be able to throw it at your workmates and have it come back. Unfortunately, the elastic isn't long enough. Every time you throw it, it snaps back and hits you in the face. Maybe Ericsson's trying to tell us something.

Novell Brainshare brain



The Brain is a venerated object in the *APC* office. Part football, part house brick, the uses it's put to are many and interesting. Staff members can even play with it under the guise of work — we just claim we're 'tossing ideas about'. Oh, the laughter. It has many other uses, but unfortunately, owing to obscenity legislation, we can't go into detail on those. Our present Brain dates back to 1996 and is showing its age, but it still beats every other squishy object in the office.

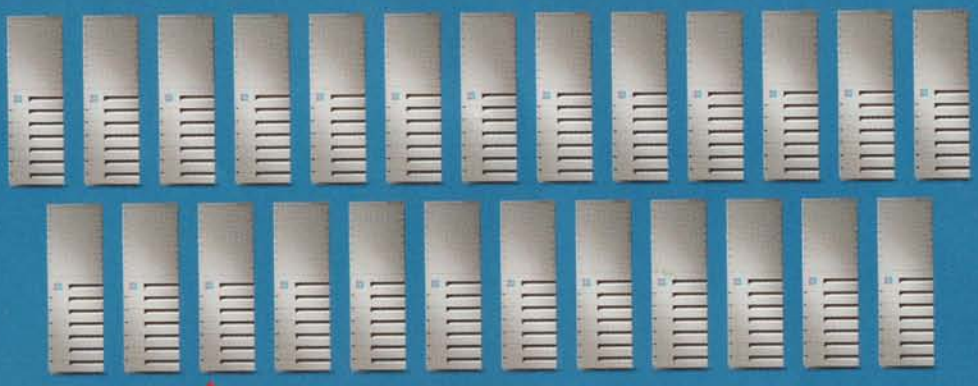
COMPETITION!

APC has a lucky dip of products to pass on to our readers. To win one of our mystery prizes — it could be software, hardware, or even a squishy ball — all you need to do is come up with the best technology-related caption for this photo (right). Just send your caption ideas in to captions@acptech.net by June 20 to be in the running for a prize. We'll print the best caption in August's Chip Chat.



Bought NT servers for network storage?

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- Pentium-class processor
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Compatibility
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- Complete NFS 3.0 protocol support, symbolic linking of files and directories, Network Lock Manager and rpcinfo command support

Network Backup
- Compatible with Windows and NetWare back-up software, including Veritas Backup Exec, Computer Associates ARCserveIT and Microsoft backup software for Windows 95/98/NT/2000
- SMART predictive disk failure analysis

Network Security
- Set access permissions at file and directory level
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Guarantee
- 3-year parts and labor

Price (SRP Incl GST)

Model 4100 (300GB)	$11,217
Model 4100 (160GB)	$7,666
Model 2000 (80GB)	$3,425
Model 1000 (40GB)	$2,116
Model 1000 (20GB)	$1,399

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